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THE

NEW AGRICULTURE.

SHOWING

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IS TO BE INCREASED TEN FOLD.

HOW MOTHER EARTH IS HENCEFORTH TO YIELD UP HER
FRUITS TEN FOLD MORE ABUNDANTLY, WITH BUT
ONE-FIFTH OF THE LABOR HITHERTO
REQUIRED,

THROUGH THE JUDICIOUS APPLICATION OF WATER.

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AND A NEW WORLD LOOMING UP STRONGLY IN
THE DISTANCE.*

By THOS. R. LOWE.



SAN FRANCISCO:

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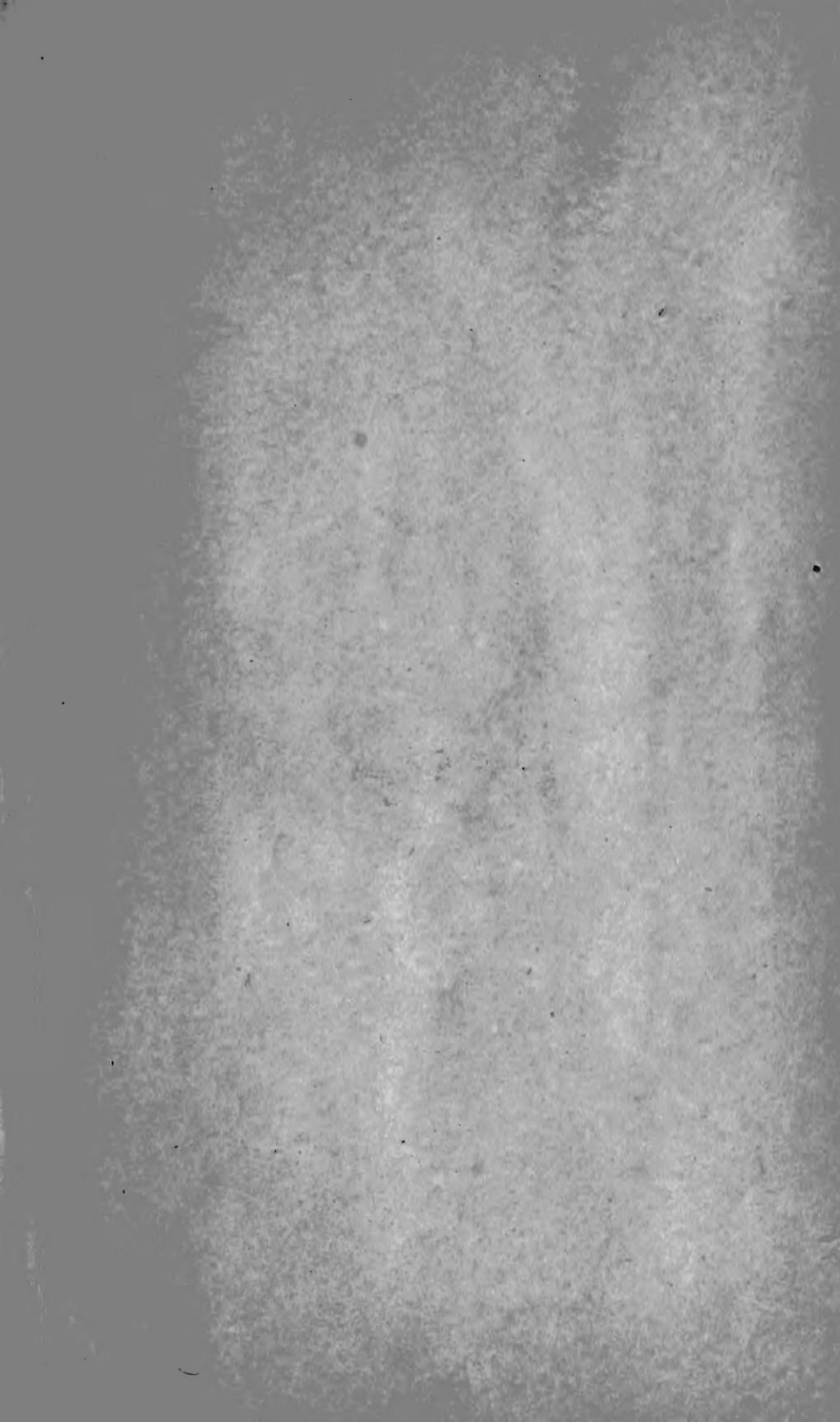


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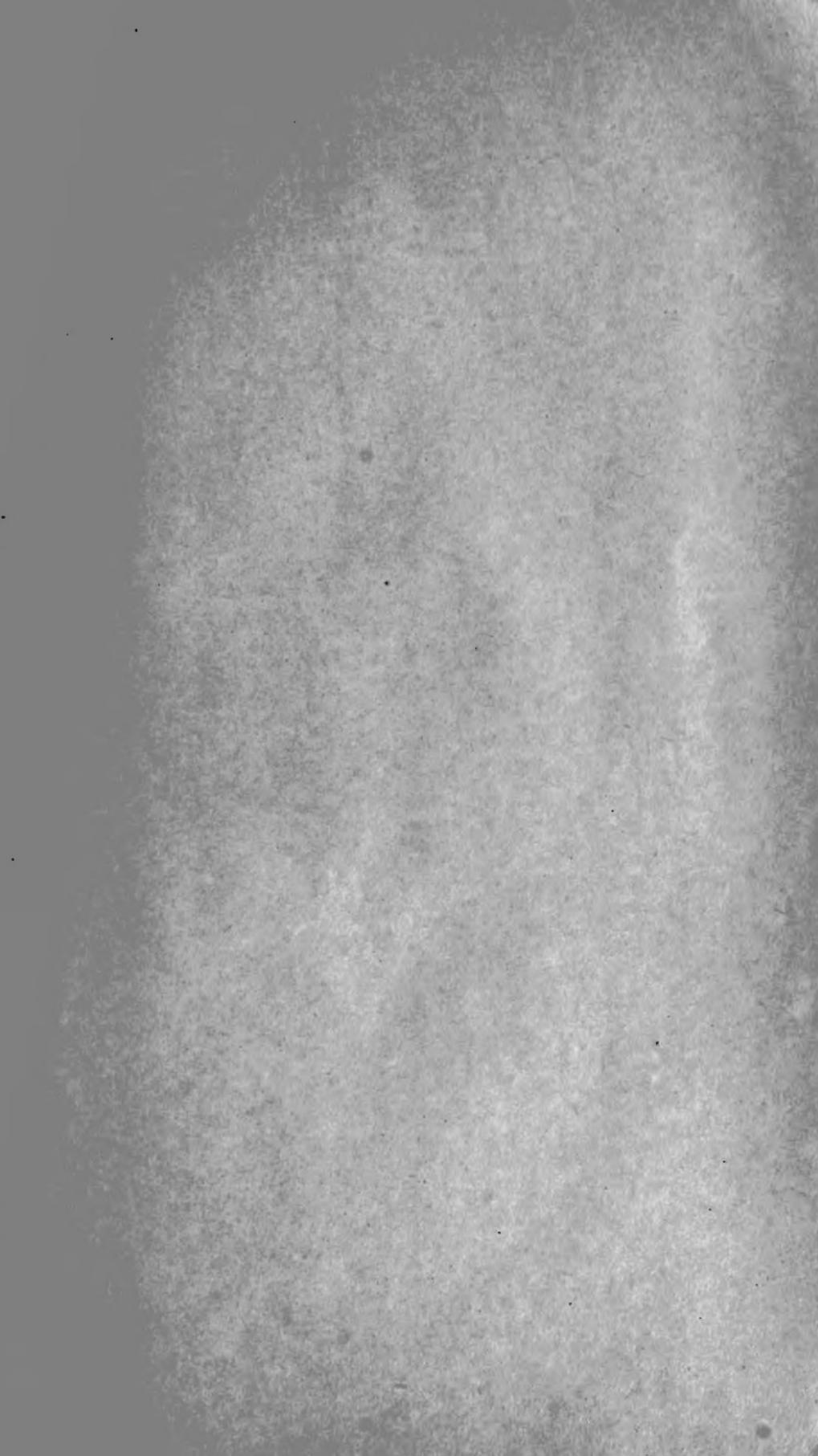
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THE DISCOVERY OF THE ART OF AGRICULTURE.

King Solomon said, that "Where the carcass is, there is where the eagles will be," and about twenty years ago, after having passed through eight years of pioneer life in California, having taken an active part in the stirring events of that period, and the excitement incident to the great gold discovery having subsided, in a great measure, and having been as diligent and lucky as the average pioneer, and firmly believing that California surpassed most other countries nearly as much in agricultural as mineral wealth, I made quite a large venture in the agricultural districts of the great Valley of California—the great valley, in this writing, includes the Sacramento, San Joaquin and Tulare Valleys—and at the end of four years from that date I found myself, financially, a total wreck; and knowing that drouth was indirectly the primary cause of my misfortune, and after mature deliberation, and with the best of reasons from certain natural phenomena that I had noticed and watched closely, although I had made an unsuccessful effort in that direction, I was unalterably convinced that there was immense wealth and prosperity to be found in bringing land and water together properly. Since then I have given the subject my undivided attention, or as much of it as I could possibly afford, and much more than I should have done in justice to myself and others. About seven years ago, after having devoted, for nearly ten years, whatever of ability, energy, labor, capital and skill I could command, in the unsuccessful pursuit of it, want of means, I thought, was the only drawback; and happening, about that time, to accidentally come into possession of what was, to me, quite a large amount of money, I thought I was close upon the track of it—and with that amount of money I could not possibly fail in overhauling it, and went to work, and, with the assistance of three friends, incorporated a company—the objects of which, amongst other things, the cutting a canal from a point on King's River, near where it debouches from the foot-hills in Fresno County, to Antioch, in Contra Costa County, via "the west side," for the purpose of irrigation and navigation. There could not have been a more favorable

field selected anywhere within the bounds of the great republic for such an enterprise. My intention was to drive out drouth, poverty and land monopoly, that is, from out the country lying between these two terminal points, and over the grave of these three arch enemies of poor people, plant the homes of tens of thousands of prosperous and happy settlers; but, over all, to set up one of the most magnificent water monopolies possible to imagine. And, whilst engaged in this laudable undertaking, and, as I thought, getting along swimmingly, as I had everything nearly in readiness, after only having used a paltry sum of money to send out a large stream of water through a large natural channel, into the middle of a roasting desert, and that, too, right in the direction of my objective point. At this stage of affairs there were a lot of "cruel messengers" sent against me, and so well were their plans laid, and so powerful and effective was the opposition brought to bear against me, that I soon found myself bound hand and foot, as it were, and was compelled, with intense shame and mortification, to witness others receive the honor and a modicum of the profit I should have gained had I been unmolested.

Now, I don't wish to complain of having my property and a portion of my ideas wrongfully appropriated by others, but I protest against the manner of it. I am satisfied the parties to that transaction had no idea of the terrible punishment they inflicted upon me; but I will do them the justice to say that I don't think it would have made any difference to them had they have known it. I had made three signal failures, in the same direction, before this one; and at the same time I dreaded failure ten times more than I feared death.

Now I think I can pick out six or seven of these "messengers" that can vie in cruelty with Jno. D. Lee, Isaac Haight, Col. Dame, Klingensmith, Carl Shurtz, Nephi Johnson and ______. But Vengeance is mine, and I will repay, saith the Lord. With that assurance I stand corrected.

The question has often occurred to me, since I have become quieted down, about this transaction, whether I would be willing, had I the power, to consign those bad old men, who have sinned so fearfully against me, to as severe a punishment as I have received; and my heart would invariably and peremptorily answer. No. For so wrapped up was I in the subject of irrigation, and the cutting of irrigation canals, overrunning the land with fatness, driving the gaunt wolves, hunger and poverty, out of the land, that I was entirely unavailable for any other purpose; the effect of the aforesaid transaction was literally to

cover me with an ocean of obscurity. I was confident that, with the intense application I had given to the cutting of irrigation canals, and the subject of irrigation proper, notwithstanding I had as yet never made a financial success of either, that with the start I had, if unmolested, I could do more for legitimate agriculture than any other dozen men in the State of California; for I was certain that all that was needed to be done was to show the dear, stupid, energetic people of California the direct road to financial success without their having to use any mental effort, and they would see that the thing went on; aye, with a vengeance. But your Californian seems to think it beneath his dignity to have to use his mighty intellect, particularly in the pursuit of agriculture. But after having been shorn of my occupation and my property in the hands of strangers, who were very hostile to me, covered with humiliation, shame and mortification, oblivion and obscurity seemed to loom up strongly in the distance. For be it remembered, that seven years ago, irrigation, in the great valley of California, was considered by intelligent people to be an impractical humbug. But I think that out of much evil has come more good, for in obscurity one has much chance for reflection, and in my twenty odd years of rambling, study and experience on the Pacific Coast, I had collected an immense amount of material, out of which to construct an original and perfect system of agriculture, based upon the judicious application of water. Thus I went to work on this material, and have wrought out one of the most beautiful things in nature, made the crowning discovery of the nineteenth century, pregnant as it has been of great discoveries. Nothing exceeds its grandeur but its simplicity. I have simply discovered the Divine plan of agriculture. There is no going behind it. The truth is mighty, and must prevail. Everything in regard to it is gotten up strictly in accordance with the unerring laws of nature. Although I have so far failed in driving drouth, poverty and land monopoly from the small area between upper King's River and Antioch, the great discovery I have made will drive them all three from the face of the earth —will do it easily and gracefully. But I claim to have exercised no extraordinary ability, however, in the discovery. The discovery of gold in California was the cause of the discovery of agriculture. I say the discovery of agriculture, for the reason that the new agriculture will be preferred to the old, as success is preferred to failure; as wisdom is to folly; as economy is to parsimony; and will as surely supplant the old as the iron horse supplants the ox team, as civilization supplants bar-

barism. Joined with an irresistible attraction, and with a natural delight in such matters, circumstances seemed to conspire and me have thrown right where I was compelled to observe and take notice of the very things in nature that would lead directly to it. Beholding the oldest and newest civilization meet face to face, had a hand in the discovery, necessity, the mother of the arts, has ever had much to do with it, the teaching of philosophy and the voice of nature, the hydraulic mines contributed to it. The effect it will have on the human family no man can tell. But of one thing I am certain, that it will be "A thing of beauty and a joy forever" to them. One very important effect it will have, it will give material prosperity to the laboring classes, and lighten their burden at least one-half. Then struggle for existence will not be so great by one-half. After it comes into general use, such scenes as transpired at Scranton, Pa., last winter will recur no more, where, according to the account of the worthy Mayor of that town, there were hundreds of young, able-bodied men, willing to work, walking around the streets, literally starving. It will solve the food problem; and the best of all is, there is plenty of it. Monopolists may tackle it, but it will be in vain; this carcass will be too big for them. There's too much of it for them, and there's no chance to steal it; as well try to steal the Pacific Ocean.

But the alternative of trying to introduce and inaugurate the new agriculture through the instrumentality of the pen is a "*dernier ressort*" with me, and it is only after exhausting every other means I could think of, that I embrace it. But the country, I believe, is ripe for it; for here we have witnessed a sustained effort for twenty years, and unparalleled energy and enterprise, with all the auxiliaries that could be asked for to boot, engaged in trying to make agriculture a success under the present pernicious and hateful system, and I think the assertion would go unchallenged, "that it was proved to be a lamentable failure;" and to take the great valley from Redding, on the north, to Kern River on the south, farming under this system has not paid expenses, take it one year with another and average it. I think this thing of raising one good crop, then one half a crop, then no crop, has been persisted in long enough to satisfy the most sanguine. The necessity for a new department in agriculture is being strongly hinted at by leading writers of the press of this State; and notably the distinguished editor of the *Colusa Sun* came very near putting his foot into it, when he penned the following item, which I clipped from the *San Francisco Bulletin*:

AN ACRE OF LAND

Japan, with a population of about 33,000,000, has an area of about 156,600 square miles. This gives a population of about 210 to the square mile. Nearly everybody has had an idea that every acre, almost, of that country was under cultivation; but we met a very intelligent gentleman, by the name of Jones, at the Commercial Hotel in San Francisco, last week, who had just returned from Japan, and who had traveled over the entire country, and he informs us that less than one-sixth of the area is cultivated. This would give us about two inhabitants to each acre of cultivated land. At that rate Colusa county would support a population of two and a half millions! This, you say, is impossible. Why?

The Chinese garden just above Colusa contains about two acres. The garden below town hardly so much. These four acres furnish fresh vegetables to all the town of Colusa and nearly a third of the county. Every day of the year wagon loads of vegetables go out from these gardens, both to town and to the country. There are at least two thousand people in the town, and the area traversed by these wagons in the country contains a great number, but there are some of them who raise their own vegetables, and perhaps some of the town people who do not buy any; but it is safe to say that these four acres furnish fresh vegetables to 2,000 people! On an average, fresh vegetables are at least one-fifth part of the living of these 2,000 people. This would give the entire living of 400 people, or 100 to the acre! If any one will take the trouble to inquire, he will find that this estimate is plenty low enough, but if we divide by 2 and say 50 to the acre, it is astonishing. Each of these gardens require eight or ten hands to cultivate them, and what they eat is not missed.

And this is a country where the rental of land is cheap. They cultivate it thus closely from choice and not from compulsion. What could they do if put to it by high rentals? When cattle raising was the chief industry in this country, we can remember when men would growl like the old Harry if another would settle within five miles of them, and the idea of a man undertaking to make a living on a section of land was declared to be absurd. This is now changing around somewhat, but it is still the idea that a man would not be justified in trying to live on a quarter section. There are other productions, fully as profitable as wheat, that will employ a man to every five or ten acres. And even in wheat it is profitable to employ more labor on the land, and consequently do with smaller farms. By planting one pound of wheat to the acre, and cultivating it like corn, as much as eighty bushels have been grown on one acre of land. The land that will not produce more than thirty bushels to the acre in the ordinary way, will produce at least sixty planted in this way. The difference will hire one man for a month. Then it may be profitable to employ ten or twelve men in the cultivation of a quarter section of wheat. Then a quarter section will be a big farm. And how large will be the population of Colusa county?

Farmers, go to studying about it. Go to experimenting, and see what it is possible to make an acre of land do.—*Colusa Sun, March 31st.*"

It is the intention here to plainly show how the new agriculturists, 32 in number, with 12 fine work horses, and with a complete outfit, can put 320 acres of the ordinary average lands of the great valley of California under as high a state of cultivation and obtain equally as good a yield per acre as those 18 Chinamen, above referred to, obtain from their four acres of choice land near Colusa. Also to show that the new agriculturists can take the equivalent of 30 miles square of the average land of the great valley, put it in the proper shape for scientific irrigation, and within three years after commencing, to cultivate and fertilize it; heavily cropping it the while, after leaving room enough between each section for an avenue 100 feet wide, raise as much produce off of it, annually, as was ever raised in the great valley of California in one season, besides keeping and feeding, from vegetation grown during the time on this land, the 9 or 10 million sheep of the valley in the finest possible condition.

And in so doing, the employees engaged in the work will be comfortably housed and lodged, and fed upon the fat of the land, besides being paid good wages, and the capital invested will pay 6 per cent. per month. The equivalent of 30 miles square can be carved out of many of the great counties of the valley, and scarcely be missed. For instance: Take a strip out of the Colusa plains, commencing at the willows, and running southward 45 miles for quantity, and 20 miles wide, would give the amount; or a strip of land commencing at Antioch, and running up the west side of the San Joaquin, 60 miles in length, and 15 miles wide, would also give the desired amount; or the amount could be carved out of San Joaquin or Stanislaus counties with ease. But as I have made a specialty of cutting irrigation canals for so long, and watched irrigation closely, and now that the subject is receiving a great deal of attention from intelligent people in all parts of the State, I think I am possessed of some very dearly bought knowledge and experience, that will be of incalculable advantage to them; consequently, before proceeding to explain the new agriculture, we will take a review, and see what irrigation has done and is doing for the great valley.

WHAT IRRIGATION HAS DONE AND IS DOING.

Irrigation, as Captain Mace, the genial landlord of the principal hotel in Borden, said, when I introduced Mr. Aug. Wiehe to

him, February, 1875, and told him that we had come down that morning on the freight train from Fresno, and had stopped over to have a look at the irrigation works, and that we intended to proceed on our way so soon as we could get our breakfasts, and the passenger train would arrive. Irrigation, said the Captain, as he passed us out the bottle and glasses, is something the American people know very little about. Some of them scarcely know the meaning of the word. "But," said the Captain, with a knowing look, "They'll learn." I thought the Captain's head was level; there is something about irrigation well calculated to deceive. And many intelligent though inexperienced people are being deceived thereby, and the very class that ought not to be, to wit—the immigrants newly arriving in California and the industrial and laboring classes. And for their benefit, as much as anything else, I have concluded to write this article. And right here I will try to throw some light on the subject, that they may take hold, with their eyes open.

Irrigation in this valley is considered, practically, to be a failure, under the present system, except in a few favored localities, and one of them is Mussell Slough, Borden, where the land is very level and the settlers, when allowed to use the full of a canal, say, for instance, 10 feet wide, and from one to three feet deep. But notably Mussell Slough has been a success, and sharpers all over the country will be trying to sell land on the strength of the great productions of that locality. On Kern River bottom, and about Kingsburg, in Fresno County, it has proved successful. Now I will inform the reader the simple though material difference between irrigable land, like Mussell Slough, and ordinary plain land, which, to be irrigated, must be re-claimed. It's the difference between success and failure. The great Mussell Slough country, if you have ever heard of it; if not you will be very apt to, if you are in California and take any interest in agriculture, because it is the principal oasis in the country lying between Stockton and Kern River, a distance of about 200 miles. It is one place where land and water are brought together very nearly right. (I think, though, we can double discount it in the new agriculture.)

It is a tract of land, I think, two or three townships in extent, lying south of lower King's River, and between Kingston and Tulare Lake, in Tulare County, California. Mussell Slough is an old ramification of King's River, and the tract of land which bears its name seems to be a rich alluvial deposit formed by the great natural leveling machine, King's River. And

the land here differs from nearly all the land in the great valley, which seems to be all important, that where a stream of water is run through a field in this section, that it saturates and wets the land for a considerable distance on either side of the ditch, say for a distance of a quarter of a mile, or, I think, further; making the cost of irrigating the land almost nothing except keeping the ditches in repair, and original cost of water right. Now ninety-nine out of every hundred acres of land between Kern River and Stockton, and throughout the whole area of the great valley, differs from the Mussell Slough country in this, that you can run a stream of water through the fields outside of that favored locality, and the ground will be as dry six feet from the ditch as it is six miles off. To the uninitiated this slight difference might seem trifling, but nevertheless it's all important. My idea of the productiveness of the Mussell Slough country is immense. But I knew so soon as I was told about the quality it had of saturating or seeping, as I believe it is generally termed, that it would astonish the natives. I have been told that all land in that locality will not irrigate so easily. It's astonishing productiveness taxes one's credulity to believe the truth. A well known sheep rancher in the neighborhood went down to look at that country, and on his return I asked him if he had seen our friend, Dr. Brandt; he said he had met the doctor at his ranch, and that he had 100 in alfalfa, and had to set apart another 100 acres to stack it on.

THE CALIFORNIA CENTRAL COLONY.

Here is a scheme said to have originated in the fertile brains of one Wm. S. Chapman, which seems well calculated for much mischief, and to entail misery and dissapointment on many poor people, and is looked upon with much disfavor by most of the intelligent and right minded people of this community. My attention was first called to it about eighteen months ago by their flaming advertisements, but thought they were harmless effusions. But to my astonishment, they have succeeded in getting many gullible people into their trap. Now, there is one trait in the character of the people, "The great Yankee Nation", that I have always admired, and that is their readiness to believe in representations made to them in regard to different kinds of enterprise, and the confidence they display in taking hold and devoting their time and money and labor on the representations so made to them by persons in whom they place confidence. In view of the high character I put upon this peculiar American virtue, I think the persons who are lucky enough to gain the confidence

of these people should be extremely cautious not to abuse it; consequently I think the projectors and promoters of this colony scheme are committing an unpardonable sin in deluding the inexperienced into the belief that they can better their condition by buying and improving their twenty-acre lots, knowing, as well as the reputed projector does, of the manifold obstacles to success. As previously stated, there is something about irrigation that is well calculated to deceive; and it seems that these schemers are trying their utmost to profit by it. I will here try to show up some of their deformities enough to put prudent people upon inquiry, and that will develop enough to convince people the best thing to do is to let them severely alone.

Now, my friends, to run water over these rough plains in their natural state is an immense labor, a most unhealthy labor, and to make any headway at it, you must have the use of quite a large stream of water; with a small stream you will make but little headway. But it is an indisputable fact that almost any soil in a warm climate will produce luxuriant crops, provided you water it often enough. But I have heard that gold can be purchased too dearly, and I think it has cost in this valley about \$2 to rain one dollar's worth of produce by irrigation, on an average, and on land as well or better adapted to irrigation than the Colony lands. These lands, to be irrigated profitably, must first be re-claimed, and it is the refinement of cruelty to entice a lot of inexperienced, credulous, and otherwise intelligent people, into an absurd and erroneous system of irrigation that has been tried and found wanting.

If there is a system of agriculture more unwise than the one previously described, in which water is not used, it is this attempting to irrigate these rough lands without first going to work and preparing them. I will say to those who have already, and to those who contemplate purchasing land in the Colony, to go to Centerville, about twenty miles east of the Colony, near where King's River debouches from the foot-hills, where irrigation first dawned on the San Joaquin Valley, and you will see that irrigating these rough lands has been abandoned, and people have returned to the old plan of summer fallowing and winter sowing, and content themselves with raising a small crop about every other year. I believe Mr. Andrew Jackson and Mr. John Wood, two enterprising farmers in this vicinity, flooded small tracts of land each, this winter, on account of threatened drouth. But ordinarily, irrigation, save for gardens, trees and vines, has been abandoned in this neighborhood. Out of the eight or nine million acres of land in the great valley, outside of the tule

lands, and that subject to annual overflow, and land like that at Mussell Slough, there is not, I think, 100,000 acres, that, to be irrigated profitably, but will have to be prepared, notwithstanding some people are raising large crops without first preparing their land, but I do not think they are doing it with much profit. It may do for a drouth, but as a general thing people will not do it. When I have seen people in this vicinity wading in mud and water up to their knees, the thermometer at 110 in the shade, building little levees around little patches 100 feet square, I was shocked, and came to the conclusion at once, that if something could not be done to relieve people from this abominable work, that irrigation should become a failure.

To irrigate those Colony lands without reclamation means just such work. And such work means fully disappointment, disease and misery.

The Fresno Canal and Irrigation Company is at present in possession of the canal that furnishes water to that Colony. A settler, in procuring a water right from those people, should first inquire into their title, and no settler should purchase a water right from any company without having it expressed in writing that he must have all the water necessary to irrigate what land he desires to cultivate. Experience has taught farmers here that when they do attempt to flood their land they require a large stream of water. Not less than would fill a flume five feet wide and one and one-half feet deep.

The above named Company have disposed of some water rights confining the farmer to one foot of water, not allowing him to exchange with his neighbor, and should he want to use a large stream would have to make terms with them, and then they would be charged all the same as though they had no water right — now they are trying to induce people by every means they can think of to buy those Colony lots whilst they have possession of the water ; and for the present, allow people to use all the water they want.

Now to make these Colony lands or any of the ordinary plain lands in this valley available for any practical purpose, the first thing to be done will be to bring water on to them; and then it is quite as important to prepare them for irrigation. Without that there is neither pleasure nor profit in them. The only successful attempt I have ever seen made to prepare so large a tract for irrigation was made by Major A. M. Turpin, three miles below Centreville on the King's River plains, who has leveled off one and one-half acres to a water level. It cost him the labor of one man and two horses for sixty-six days, at the

rate of \$132 00 per acre, counting his man and team three dollars per day.

Very few people can readily realize the situation as my friend, Capt. Mace, well said; "Irrigation is something that the American people know very little about." And it is something that I personally know to be well calculated to deceive; and wherein I think I am well able to point out to the reader, and intend so to do. I am satisfied that it is the hope of the country, and will be the means of an entire new departure in agriculture; that it will transform farming from the poorest occupation to the most remunerative and attractive one there is. But to set a lot of inexperienced people to work at this late day to putting out trees, vines and shrubbery on these rough lands is doing both them and the country great injustice. They had as well be set to raising cotton before the invention of the cotton gin. It is well calculated to disgust people with irrigation. These plains need reclamation as badly as do the tule lands in the Colorado desert, for in their natural state they are only calculated to deceive the unwary. For I hold that what we cannot do with profit we virtually cannot do at all.

It may do well enough for some rich men, I know, to indulge in this pastime, but not for the industrial and laboring classes. A farm of three or four hundred acres of land, that was one of the first farms irrigated on King's River with ditches, with first water rights running wherever necessary through it, changed hands about two months ago for less than ten dollars an acre, and was not considered anything of a bargain at that. Some people will say, "Oh, they have chills and fever on King's River near Centreville." Yes; and when people go to work to irrigate rough lands, such as about the best of these plain lands are, in the manner I have described, they will certainly have them. The Chinamen working on the ranch of that enterprising and highly esteemed gentleman, Mr. F. T. Eisen, near the California Central Colony, are said to have been literally shaken out of their boots last summer with the chills, caused by wading in the mud and water trying to irrigate his vines and trees, and his land is as level as the best lands in this community, and is better adapted to irrigation than nine-tenths of the land in the country. But for all that they should have been prepared the first thing after getting the water on them. When I started in after water seventeen years ago I thought it was a cure for all the ills that California agriculture was heir to; and after following it up closely, studying it profoundly, "sounding all its depths and shoals," I am not only fully confirmed in what I

then thought, but am perfectly satisfied that it is to be the chief nourishment and principal factor in all scientific agriculture, not only in California, but throughout civilization — that it will be the most efficient and cheerful servant employed by mankind — that it will do more to ameliorate and elevate the condition of the laboring classes than any other instrument in the hands of the Lord. But I don't think it necessary that California and all creation should have to go through all the bitter experience, defeats, mistakes, disasters and failures that I have. I think I have found and can point out the direct road for the industrial and laboring classes everywhere to health, wealth and wisdom. In my first efforts I thought, in the simplicity of my heart, that when I had a constant stream of water running through a dry plain, that I held a key that would unlock the agricultural wealth with very little trouble; and it took me a wonderful long time to find out the reason why farmers would not avail themselves of the great advantages held out to them to buy water, irrigate their lands, and raise fifty or sixty bushels to the acre instead of ten or twelve. Mr. J. D. Forthcamp, that efficient little Dutchman that is and has been Superintendent of the Henrietta ranch for several years, came near hitting the nail on the head, three or four years ago, whilst I was riding out to the ranch one day with him on his wagon, when he said, "These large landholders think so soon as the big canals are completed, and running out to the plains full of water, that then we will have no more trouble from drouth, and that everything will be lovely." "But," said he, "the battle will have scarcely commenced ; that without first preparing the land the water had as well remain in King's River." But it was an impenetrable mystery to me, after I had run out two or three ditches of water through settlements whose only drawback was lack of moisture, for they could get a good price for their produce. I thought it must be lack of foresight, industry or enterprise surely for on the Umatilla meadows they could get two or three cents per lb. for barley. But after coming down to Centreville, Fresno County, and seeing energetic and industrious people try it thoroughly and abandon it, I knew that something must be done or irrigation would never come into general use on this coast.

After a sojourn on this Coast for nearly twenty-eight years, taking a lively interest in everything pertaining to agriculture the while, and having studied the facilities for irrigating the great valley, and having examined most of the water courses leading in to it, I have no hesitancy in saying that there is, if

proper steps are taken for the economical use and distribution of it, an abundance of water to irrigate every acre of land lying between Redding at the upper end of the valley and Kern River at the lower end. I came to the conclusion long since that Nature intended the great valley to be irrigated, and after seeing the splendid effort to make farming without water a failure, and after seeing the attempts at irrigation save in a few localities prove futile, I came to the conclusion that nine-tenths of the great valley was either good for a high state of cultivation based upon the judicious use of water or good for nothing. What value is there in land that a hard-working and ordinarily intelligent farmer, with all the necessary appliances and means to boot, cannot more than make a living on? I admit that much of it is fair to look upon, especially in the springtime, when it has "all its bravery on." But that is of no great practical value. About five years ago I went to work in earnest to originate a system of agriculture, based upon the judicious application of water, and flatter myself that I have been eminently successful. I think I have certainly found Great Nature's plan. Whilst I was searching for an island I have discovered a continent. It's not only applicable to these rough plains in the great valley of California, but to all creation; and so soon as it comes into general use failure of crops in California will be known no more forever. I was absent from this State during the dry season of '64, but from what I can learn there was plenty water ran to waste in the different water courses, had this system been in operation, to have raised more bountiful crops than was ever raised in this country. One of the manifold advantages of this system is, that the land will at all times be prepared to receive the water, and all that will have to be done when the water comes will be to open the gate and let it on, for the water will go of its own volition right where it will be needed. Human nature seems, of all things, to dislike innovation. People become joined to their idols, and it's hard to get them out of their old habits, especially when they have been joined to them for centuries. I will cite a case in point of human nature unadorned. When the English conquered India they found millions of the natives engaged in agriculture over a vast and fertile plain, irrigating their lands with water pumped from wells. Some English capitalists and engineers thought they saw a splendid chance for a speculation in furnishing water to the aforesaid natives, by means of canals; and straightway went to work, and with an enormous outlay of capital, skill and labor succeeded in the construction of an im-

mense canal out of the river Ganges, through this great plain, thinking, of course (as who would not), that the natives would joyfully patronize them ; but, to their astonishment, the natives persisted in their time-honored custom of pumping water out of their wells, and told the canalmen that "their fathers irrigated their lands by pumping water, and what was good enough for their fathers was good enough for them." That was a pretty good joke on those speculators, wasn't it? I believe they were only out about sixty-five million dollars, and the authority, above quoted said that the waters of the canal ran to waste for thirteen years without paying the cost of keeping it up ; but finally the natives figured it out, through their massive intellects, that they could do better by patronizing the canal ; since when the canal has paid at the rate of 36 per cent. per annum. Of all people the American are the farthest from being like these natives ; but still that is human nature, and all people are that way more or less. Agriculture is the natural occupation of mankind and the most important of all the sciences. It is the mother of the whole family of sciences. Without it literature, painting and all the fine arts and all the useful arts would perish. I was speaking to a young gentleman, a few evenings since, who steps in to see me occasionally, and one who has made one or two unsuccessful farming ventures in this vicinity, about farming systematically. After listening to me sometime, he remarked, dryly, "That people who had wits were supposed to do something else ; that farming was for people without wits." Erroneous though it is, it seems to be the ruling idea that is abroad in the land. That distinguished, cultured and honey-tongued gentleman, Hon. Horatio Seymour, says loudly, "That something must be done to make agriculture attractive ; that the young men are leaving the farms and swarming into the cities." The cry comes up from New Hampshire that over two thousand farms have been abandoned from the fact that the fields are exhausted of fertility and tenants cannot afford to rent them.

A gentleman in San Francisco, lately, after listening attentively to a learned professor eloquently orate on agriculture, made the practical and pertinent remark that some light should be given the farmers that would assist them financially. Here are some important facts set forth. It shows that there is something radically wrong in the agriculture of the present.

The great source of trouble with the agriculturists of the present day is, they have boldly set nature's laws at defiance, and again they have exhausted all their ingenuity in the perfecting of

machinery to put in crops and harvest them; and whilst they have been eminently successful in these, they have invariably overlooked the most important branch—that is, the science of fertilizing—treated it with the utmost contempt. The most important thing, as one writer has well said, "Is to farm good land." The new agriculturists intend, in revenge for the neglect visited on the fertilizing branch, to set that branch so far ahead that the agriculturists of six thousand years hence will have no improvement to make; and will proudly say, with those natives above referred to, that what was good enough for their fathers will be good enough for them.

THE GREAT LEVELING MACHINE.

In preparing land for the new agriculture, and the subsequent operating of it, the mechanical forces of nature will be called upon to take an active part. To prepare land for irrigation proper is a subject of the first importance to the California agriculturist, although it is not generally known, and is a subject well worthy of the best minds in the country. My process, for which I hold letters patent, is peculiarly a California invention, and would have taken, at least, centuries longer in any other country to have dropped upon it. The lands in this or any other county, tule lands excepted, generally lay on an incline, generally conforming to the nearest water course. To show how it is done, let us take, for instance, 320 acres of that smooth land lying between Woodland and Cacheville, in Yolo Co. It's nice, smooth, level-looking land, but in no wise susceptible of profitable irrigation, without first being reclaimed. You attempt to irrigate it as it is, and you will literally think there's mountains in it. We will say that it has been purchased by a Co-operation Co. That the district system of irrigation is in operation. That the following described tract of land comprises the Cache Creek district, to wit: A line drawn due east from Duningen to the Sacramento River, at Knight's Landing, is the northern boundary, and from thence down along the edge of the tule to a point half way between the sink of Cache Creek and the sink of Putah for the eastern boundary, and from thence due west to the foot-hills for the southern boundary, and from thence northerly along the base of the foot-hills to the place of beginning for the western boundary.

That the said district has condemned, for the public use of said district, all the water rights and franchises, and all aqueducts canals and ditches leading out of Clear Lake and Cache Creek, and constructed a good and sufficient dam across the head of

Cache Creek, where said creek runs out of the lake; said dam to be high and strong enough so as to raise the water in the lake 6 ft. above high water mark, and to hold it until wanted, with the lake tapped 6 ft. below low water mark. Then district canals, running within a mile or so of each other, to which all land owners are to have access, by paying their pro rata for keeping them in repair. By having the improvements above described around the lake, they will have plenty of water all the year round, and immunity from drouths.

But the writer knows these people of Yolo Co. of old. They don't think there is anything in irrigation. He tried to induce them to irrigate their lands, when he was here 17 years ago, by assisting to the extent of one-fourth in the construction of the Cacheville agricultural ditch, the second irrigation ditch constructed in the great valley (Col. James Moore having built the first one). But they wouldn't then and haven't since availed themselves to any extent of the advantage of it. When this writer thinks a certain system is wise and good for people, and tries his level best to enforce his views on them, and they will not accept of them, he is in no wise violent about it. He thinks they are but exercising their high prerogative. And perchance, if his efforts are derided and laughed at, he is very apt to subject himself to a rigid self-examination, and see if those who laughed were not in the right of it. But after taking all the facts in the case into consideration, he still thinks he is in the right; he always reserves the privilege of bringing the matter up again in a different shape.

And now he comes back to the place from whence he started, like one of the idlers that are said to have laid the foundation of Amsterdam. He thinks he has found a royal road to irrigation, whereby a couple of robust, intelligent, twelve year old children can do the work in forty minutes necessary to irrigate to perfection 320 acres of land, by simply raising and lowering a few gates. For, you see, he don't often start in after anything; but when he does, he goes in to stay—that is, so long as he thinks he is right; or perhaps can.

As aforesaid, let us take this half section, which is the south half of section—T—R—, lying parallel with Cache Creek, which has a district canal running full of water right on the upper line of it; and we are allowed to use all the water we want out of it. The first thing to be done is the work of the engineer, who tries it with the leveling instrument, and finds out, perchance, that the altitude lowers, commencing on the west line close to the district canal, going eastward at the rate

of 6 feet permile; or, in other words, this tract of land higher which is one mile long and one-half mile wide, is 6 feet high at the west end where the district canal passes it on the east end. To put this tract in proper shape for scientific and profitable irrigation, we will divide it into four different tracts: commencing on the lower end, we will measure off three one hundred acre tracts, running up for quantity, leaving a strip 10 rods wide and 160 rods long on the upper side, but making calculation to leave the amount of ten acres on the outer edge of the main tract for levees, roads and ditches. We will commence work on the lower tract the farthest from the district canal. We put a levee nine feet wide at the base, and three feet wide on top, around three sides of it—the levees to be one and one-half feet higher all around than the land will be after it is leveled, and as this land has a fall of six feet to the mile, and as these 100 acre tracts each embrace nearly one-third of a mile, they are, of course, two feet higher on the upper side than the lower. To put them on a water level, we have one foot cutting on the upper side and one foot filling on the lower side; consequently, our levee will have to be two feet six inches high on the lower side, the levee on the other two sides will taper in height, as they approach the upper end, until they will be only six inches higher than the surface of the ground is on the upper side. The other two one hundred acre tracts we will prepare in like manner, making the lower levees of the upper tracts serve as upper levees for the tracts below them. Now we have these tracts in a shape so that when we fill them full of water to the tops of the levees the water will stand six inches deep on the upper side and two and one-half feet deep on the lower side; but we to prepare them in such manner that when the water stands one-half inch deep, on any portion of them, that the ground inside the levees will be entirely submerged with water. The next thing we will do will be to insert two boxes in each of the lower levees, with stationary gates in them just as high above the surface of the land as the land will be after it is leveled. And as we have seen that we have one foot cutting on the upper side and one foot filling on the lower side, then our stationary gates will be one foot high. The boxes in the levees must be sunk in the ground so that one-half of them will be below the top of the stationary gate, and one-half above it, for the gates will be so arranged that, to close them, they will be raised up and to open them so as to let the water pass out, they are then to be dropped. It must be understood that there are to be sliding gates, that are to be lowered and raised just

behind the stationary gates. The reason for having them so arranged will be very apparent in the subsequent operations; as the water can be either dashed out in torrents, by suddenly dropping them, or let out gently by gradually lowering them, and compelling the water to run over the gate, dropping into the box below, without disturbing the level of the land near it. Now we will put a levee on the lower side of the narrow strip, two feet high, above described, with levees joining it to the district canal, which has embankments three feet high. Now, according to the regular fall in this land, the ground on this strip of land ten rods wide is two and one-fourth inches higher on the upper than the lower side; to level this we will have one and one-eighth inches cutting, and one and one-eighth inches filling; consequently, our stationary gates will be one and one-eighth inches high above the surface. Therefore, the boxes will have to resemble the others. To level this narrow strip of land will not be much of a job. But to do this, we will require a stream of water under pressure. Say, for instance, what will pass through an inch muzzle under 200 feet pressure, with the necessary hose to accompany it; said pressure to be obtained either by bringing water from great elevations in pipes, or by using steam force pumps, mounted on wheels. In this case we will use the latter. We now have a strip of land ten rods wide and 160 rods long, with one and one-eighth inches cutting from the upper and one and one-eighth inches filling on the lower side. We have to remove the high portion down against the lower levees. In this case, on account of the narrowness of the strip, we can keep our engine on dry ground on the other side of the district canal. We will go to work just as the miners do when they want to remove a bank of dirt. Steam will be gotten up, water pumped out of the district canal, just as the steam fire engines do. An experienced hydraulic miner will man the hose, and fire away at the higher portion of the ground; and it is well known to that fraternity, at least, that there is no better instrument to tear up ground than a stream of water under great pressure. He reduces the higher portion of this ground to thin mud, much faster than a team of ten horses could plow it; and the thin mud in this case has the happy faculty of gravitating to where it is wanted, down in the low ground alongside of the levees. But, in case it does not move with the celerity he likes, he will know how to sweep it down with the water, like a woman does the dirt with a broom. Whilst operating on one end of this strip, the water from the hydraulic must be compelled, by closing the gate near by, to run to the furthest

gate to make its escape, so as to give it a chance to deposit all the sediments. The engine must be moved up to the face about every 200 feet, so as to keep it as close to the work as possible. When he gets to the lower end and looks back, he will be very apt to see the ground on the desired level. There's one job done, without much trouble. But we have got a little ahead of our work. Before commencing to level this strip temporary ditches should have been made all along the upper side of each of the hundred acre tracts, six feet wide and one foot deep, close under the levees that run along on the upper side of each—said ditches to be extended down along the end of the high portion of the ground that is to be removed, and the gates of all those of the levels should have been raised high enough to back the water so as to entirely submerge the land inside the three lower levels for the purpose of softening the ground, and making it easy to hydraulic.

Now we will commence the second level (which is the upper of the three large tracts). We arrange our engine differently, as each of these tracts are about 1,700 feet in width, and as the upper half of each is above grade, we will have a face of 850 in width to work upon, and instead of only one man with one hose and pipe, we will use eight men, each with a hose and pipe, disposed along the face of the higher portion of the ground, 106 feet apart. But the streams will have to be smaller accordingly; one-half of the streams starting out on either side of the engine. We will not require of them the entire work of transporting the higher portion of the ground; the most we will ask of them will be to dig up the ground in front of them, and convert it into thin mud; and to assist the big head of water, we will dash down, through those temporary ditches, the embankments on the lower side of said ditches, to be washed away as fast as the work proceeds. We will start in on the second level on the end that the temporary ditches were extended down along; the narrow strip that we have leveled, we will now use as a reservoir. We will get our water to supply the engine and hose-pipe out of the said reservoir by means of a large hose-pipe extending to small boxes that we will insert in the levees. We will raise all the gates in the lower side of the narrow strip to their full height, open the district canal, and filling the reservoir to the top of the levees, get up steam in our engine. The hose-men will commence piping on the face of the bank in front of them. Each of them will have what the miners call a breast in front of them 106 feet wide. They will be able to deal tremendous blows, as their streams of water, under heavy pressure,

are calculated to throw a stream of water a distance of 150 feet each. They will be particularly enjoined not to strike deeper than is actually necessary, or any deeper than the cutting is in front of them. When they have a space in front of them torn up the full width of their breasts, and 27 feet into the land, and converted into thin mud, then the gate furthest from them in the reservoir will be dropped suddenly, and a flood of water will rush out of the reservoir in a stream ten feet wide and two feet deep, like a torrent down through the temporary ditch (the embankments on the sides of which must be high enough to hold it, as the upper side will be protected by the substantial levee) to the scene of action, when it will gather up the thin mud the hose-men have been manufacturing and sweep it off like a tidal wave, and carry it off and deposit it in the lowest places to be found, and especially will it fill up and hermetically seal all the squirrel and badger holes; the thin mud will run into them like molten lead. The man who mans the gate will not allow the flood to run longer than five minutes, but will raise his gate and allow his reservoir to fill. The gate in the district canal will be so arranged that when the reservoir is full the water will waste over it. There should be several wide gates admitting water out of the district canal into this temporary reservoir, so that it will fill without delay. After the flood subsides the hose-men will be astonished to see how clean a sweep those angry waters have made of the mud. It will seem that the waters were not content to take only what of the ground was dug up by the hose-men, but would scour deeper. The water, as before stated, must be compelled, by raising the gates on the lower side of this level nearest the scene of action, to run to the gate furthest from the scene of action (which gate will be dropped, and the water only have to pass over the top of the stationery gate) to make its exit; and the gates on the two levels below, whilst the leveling process is going on in this one, must be raised so as just to admit of the water passing over them. When the flood subsides, a row of thin plank joined together, and set up edgewise, must be the full length of the face of the high ground, so as to make a temporary wing dam for the purpose of holding the next flood up to the face and to keep the new made mud from running back on the ground that was cleaned off. When an advance has been made 200 feet into the land, the engine must be moved up close to the front, by means of putting down wide plank, crosswise, six feet apart, and then laying stage plank on top of them, making a temporary track in this manner, from where it is first stationed, to

where it will be halted at the front. Then all hands take hold and send it up with a rush. When this level has been passed over in this manner this leveling company will start back on the next level below, subjecting it to the same treatment, meanwhile using this one for the same purpose as the upper level was used (for a reservoir, etc.). My friend, Mr. McCall, can build all the levees and ditches above described in a day, with his patent levee and ditch builder, using twelve horses and two men.

The dirt to build these levees invariably to be taken from the inside; veteran hydraulic miners will be astonished to find out what slight resistance these valley lands oppose to the powerful stream of water under pressure. Now to level one of those 100 acre tracts, which, 2640 long and 1700 feet wide, the cutting being one foot on the upper side and running out to nothing at the distance of 850 feet, which, to double it up, would equal 425 feet wide and one foot deep, and 2640 feet x 425 feet would equal 1,122,000 cubic feet divided by 27, would equal 41,555 cubic yards at 25 cents per cubic yard for digging it up in the ordinary manner, removing it the average distance of 850 feet, and spreading it out evenly; which is as cheap as it probably can be done, would cost \$10,385⁷⁵₁₀₀, or nearly \$104 per acre. Its the transportation that breaks them down; and then to level land in any other way than the hydraulic process, as my astute friend, Dr. W. L. Graves, suggests, the squirrel and badger holes will cause it to fall out of shape so soon as the water would be run upon it. This is Nature's plan; all the naturally level land you see was leveled by water. This plan is well illustrated on the upper side of the railway track between Niles station and San Jose, where the storm waters last winter came down from the hills in torrents, heavily laden with thin mud washed from the sides of the hills, and deposited it on the upper side of the railroad levees, leaving acres of land as level as a house floor on the subsidence of the waters. I think, with this plan, the land can be leveled at the rate of twenty acres per day, with a first-class engine, like No. 33, now in use in New York City as a fire-engine, an account of which I read in *Pomroy's Democrat*, about eighteen months ago, at a cost of not more than \$10 an acre. I am certain that it will not cost more than that.

That it is absolutely necessary to prepare almost all land in this valley prior to attempting to irrigate it, one has only to make the attempt, to find out that it must be done to insure success. Now we have our four tracts of land on as many different water

levels, with the three large tracts terraced, each two feet higher than the one next below it, with the narrow strip still higher than either of the others, with good and substantial levees surrounding them all, with good and sufficient gates and boxes so constructed that water may drop from one level into another without endangering the levees or disturbing the level of the land, for the reason that the water, in dropping from one level to another, drops into a box below sunk a foot or so in the ground lower than the level dropped into. Now water turned into one corner of the upper level will be made to run to the furthest corner on the opposite side, by means of closing the gate near by to pass out to next level below, and from there diagonally through all four of the levels—thus making the water run over the land in a thin sheet a distance of four miles to make its escape, and to know that this is the best shape possible. Go ask the mountain meadows; and if you should happen to pass through some of the many of them this winter has camped in, you would think, perhaps, you never knew before how luxuriant grass and clover could grow. Say, for instance, Grass Valley, Penn Valley and other mountain valleys in Nevada Co. after the dreadful winter of '49, and later years, on the head waters of John Day's River, Snake River, Feather River, King's River and the San Joaquin. There are mountain meadows on the head waters of all of them that are the picture of wealth and luxuriant beauty. They were used as models; their formation studied to obtain this faultless foundation for the new agriculture. Whenever, in passing through high mountain meadows, or perchance through the low valley lands, and behold natural meadows of unsurpassed luxuriance, you can be assured that nature has first prepared the land on which it grows with her great leveling machine, water. This foundation is plainly dictated to us by nature; for in almost all her unusual displays of luxuriant plant growth, she invariably shows them up on a similar foundation.

I do not know if, in my not very lucid description of this process, I have made it understandable to the reader. The great trouble in putting it into practice is, that our people know so little about irrigation that not more than one in a hundred of them know that it is at all necessary to prepare their land before attempting to irrigate it; and persons who now control land and water together are very anxious to keep that fact concealed until they can unload. Professor Davidson, a distinguished gentleman to whom California is indebted for much valuable information in relation to irrigation and the construc-

tion of irrigation canals in Egypt, India, and elsewhere, stated, in a paper read by him before the Academy of Sciences lately, "That in the southern part of the great valley of California land is dear at a dollar an acre. Put water upon it, marry the land and the water, and you know that the farmer would hold it at \$50 per acre. If the professor will come out to the King's River country he can find considerable land that has been "married to the water" for twenty years that he can buy for less than ten dollars an acre. Why, new land in the great Mussell Slough country, well set in alfalfa, could have been, last fall, and doubtless can yet be, bought for \$40 per acre, with water right thrown in; and that in one of the most favored localities in California. But in regard to the process above referred to, the result of the experiences of this winter, after having made a specialty of such matters for so long, and had unusual facilities for collecting information on these subjects, is, that that is the shape that land must be put in to irrigate to perfection and consequent profit, and that that is the process to put it in shape.

When I first began to study on this process for preparing land, I had an intense hatred for land monopoly; I thought it the embodiment of evil; the worst enemy of the laboring classes; a foe to liberty and progress; a relic of feudalism. I thought the Hon. Jno. M. Days, of Nevada Co., drew a flattering picture of it, when, in a speech in the California Legislature, about four years ago, he said, in substance, "that hoodlumism, intemperance, prostitution, burglary and murder were individually and collectively bad, but that they all paled into insignificance alongside of land monopoly, for it was the parent of all of them. Now a person only has to see what I have seen and feel what I have felt, to know the truth of this; and when I had matured this plan, and found that it was good, and began to think of the probable effect it would have, without proper reflection I came to the conclusion that it would benefit the land monopolists more than any one else. Whereupon I was much grieved; I thought that God must be very angry with me, because everything I attempted to do turned out to humiliate and plague me, and not until I began this writing, and figured closely on it, that I found out it would have a contrary effect from what I first imagined, I found that it would not only level the land and put it in shape, that with a minimum of expense a maximum of results can be obtained, make agriculture one of the most renumerative and attractive occupations known to mankind throughout Christendom, elevate labor, depress shoddiness, furnish a standard safe and profitable employment through a judicious system of

co-operation for the labor and savings of the industrial and laboring classes, show the California farmers and farmers everywhere how to restore their exhausted fields, fertilize those that are barren and infertile, show our northern brethren how not only to raise two crops a year and increase the productive capacity of their land ten fold, but how to ripen potatoes, strawberries and the like, nearly as early as we do in California; show how to make the Humboldt Desert bloom like the rose of Sharon or the lily of the field; how to turn the Colorado Desert into a coffee plantation; how to make the great "rainless desert" on the line of the Southern Pacific Railroad, known as the "Llano Estacado", or "staked plain," more productive than Mussell Slough. And before, as some scientists foreshadow, men will so increase and multiply on the face of the earth that there will not be standing room for them; the great deserts of Sahara, Gobi and Libyan (in spite of their shifting sands) can be made as fertile as the Polders of Holland reclaimed from the Zuyder Zee alongside of the new North Sea Canal, which now sell for \$400 an acre by turning the "overflowing Nilus" on to them. But what is the best and most important item is, that it will furnish a plank for the land monopolists and Chinamen to walk out on, hand in hand, for they are both calculated to degrade labor. To show how this will be done, we will have to introduce

THE NEW AGRICULTURE.

Now comes the new agriculturist to take charge of the three hundred and twenty acre tract that we have been watching the levelers prepare for scientific irrigation, who proposes to show that his predecessors have been superficial, none of whom ever reached a proper depth for a scientific foundation; that he alone has sunk to the bed rock and struck it rich. He thinks if there has been any one fact more clearly proven to agriculturists by the experience of ages than another, it is, that the higher state of cultivation you put your land in the better it pays. The most notable illustration of this fact, that has come to his knowledge, was an experiment made at Stokes Park, in England, by some intelligent gentleman who had two tracts of land of the same number of acres and similar in every respect, set apart for cultivation, and a careful account was kept of the money and labor expended on each tract. One of the tracts was cultivated in the best manner possible in the ordinary way, and on the other they went to extraordinary expenditure in the erection of a large tank, at considerable elevation, and putting up an en-

gine with force pumps wherewith to force liquid manure up into the tank, and from the tank a net work of pipe was laid throughout the field for the purpose of distributing the aforesaid liquid manure by means of a hose and pipe, with sprinkler attached ; and after putting in and cultivating crops, sparing no pains with either, and after harvesting and disposing of the crops, and making a careful estimate of the receipts and expenditures, the result was that there was double the net profit returned from the field upon which the extraordinary expense was incurred over the other. This agriculturist thinks this favorable result was obtained through the more judicious distribution of fertilizers in one case than the other. He also thinks he will be able to show the reader his plan for distributing manure, which, if not quite so efficacious as the one described, it will, undoubtedly, come nearer to it than any other plan possible to devise, and the cost will be merely nominal, as it will be accomplished by taking advantage of the law of gravitation. He will now undertake to build this field up into the highest state of fertility known to agriculture, and confidently expects that within three years he will have so fertilized it (heavily cropping it the while) that its productive capacity will have increased ten fold over its former average production ; or, in other words, to make each one of these one hundred acre tracts to produce as much as one thousand acres of the land adjoining it, farmed in the ordinary way. But to do this he expects to use more capital and labor, but no corresponding increase of either, however.

The farmer is strongly imbued with the Egyptian idea of perpetuity, and is intensely utilitarian, and will put no improvement on this land that is not actually necessary; and whatsoever improvements he puts upon it will be put there for a purpose, and they will be put there in such a substantial manner that they will be able to answer that purpose, without straining them in the least.

He believes there is great profit in legitimate farming, if it is pursued wisely. He has went to great expense to put these four tracts on as many separate water levels, and wants them to remain so ; then he will measure off four acres off the south end of the narrow strip, or, as we will call it, the upper level, for a garden and for trees, vines and berries. He will throw a levee up twelve inches high on the north line of the garden tract ; then he will put a box or vat in, right under where the water pours out of the district canal into the garden tract, for the water to drop into and for the purpose of holding solid manure, but with screens or strainers across the outlet so that solid manure will

not pass out. He will then put up temporary stables and dwelling on the upper level north of the garden tract. The farm is now in shape to irrigate to perfection. His teams have been engaged in hauling manure from the nearest livery stables and sheep corrals for the last month and banking it up near where the water will drop into the vat above mentioned ; then he will turn on the water from the district canal about ten feet per second, which will drop with considerable force into the vat that will be kept filled with manure, thereby grinding it up and converting into a liquid state ; from thence the water will pass out through and over the garden tract, and dropping from thence through the open gate into the southwest corner of the second level ; and after spreading out over that level and running in a broad shallow stream 1,700 feet wide and about one inch deep, about 2,640 feet in a northerly direction, it will drop from this level through the open gate into the northwest corner of the third level, and from thence it turns back and runs south in the same broad and shallow stream to the open gate at the south end of this level and drops from thence through the open gate into the fourth or lowest level, and from thence it will turn and run north in the same broad and shallow stream to the open gate in the northeast corner of this level, where it will finally pass off this land, thus compelling the water, heavily laden with manure, to pass in a thin sheet over the whole of his land intended for cultivation. (This is a very good way for distributing manure, but he intends to decidedly improve on this plan.) The perfection of irrigation consists in a thin sheet of water passing over land. This he now has. He begins to fertilize. During the reign of Napoleon III. that monarch commissioned a number of French savans to ascertain and report to him what were the best fertilizers. After a great deal of research, they answered that "slime from rivers" was the best. It is a well known fact to scientists that water, when passing over land in a thin sheet, like this new agriculturist has it, has the quality of depositing in the land so passed over all the ingredients it holds in solution favorable to plant life, and of extracting therefrom all the ingredients inimical to plant life. Now it seems to me that the knowledge of the fact of water having the extremely happy qualities above mentioned plainly tells us that Nature, in her economy, intended that water should be so utilized in all agricultural enterprises and in all climates. He will let the water run in this manner for a couple of weeks ; then, supposing it to be the first of November, he will shut off the water and let the ground get sufficiently dry for proper cul-

tivation. (For he thinks if there are two men who will eventually bring up in a very warm climate, it will be the blacksmith that hammers cold iron and the farmer that plows wet land.) Then he will purchase a sufficient quantity of the best seed wheat in the market to seed these three levels, without plowing the land (mind you). He plants his wheat by drilling it in rows about eighteen inches apart. After the wheat is planted he puts his teams to foraging around the country for more manure, and has them to bank it up near the vat above mentioned. About the middle of March his wheat will have attained the height of three feet, which he cuts for hay. (When he has hay to cut he always has it carefully spread out so soon as it is cut, so as it will cure readily, and then uses all possible despatch to have it in the stack as soon as possible.) So soon as the hay is off the ground, the water, laden with manure, will be sent on to land, as before, and is continued to run night and day for forty-eight hours. The waters at this season of the year generally hold much fertility in solution, as the rivers are often bank full at this time. When the water is turned off and the ground is in proper tilth, he will run cultivators between the rows, and cultivate the ground thoroughly ; then he will cultivate it cross-wise of the rows, tearing up one-half of the wheat plants. He will carefully train his horses that they will not step on the rows of grain. When harvest comes on he will confidently expect to harvest at least seventy bushels to the acre, or 21,000 bushels of grain from the three levels. In the meantime he has in no wise neglected the four acres set apart for a garden ; and by means of having it on a water level he has been enabled, through making his plant beds the full length of the garden tract, to cultivate it as well and thoroughly with his horses, plows and cultivators as Chinamen could do with their shovels and hoes. (Thus substituting the horse for the Chinaman.) He has used one-half of it for trees and vines, and the balance for vegetables. Let us now see what show there is for profit on this crop. We will first ascertain the probable expense, to wit: Hauling manure, \$1,000; seed, \$300; planting, \$300; harvesting hay, \$600; cultivating grain, \$300; heading grain, \$500 ; threshing 21,000 bushels, at 74 cents per bushel, \$1,470 ; sacks, \$1,600. Total expense, \$6,070. Then we will count up the receipts, which will be: 21,000 bushels of grain, at \$1 40 per cental, or 84 cents per bushel, \$17,640 ; 450 tons of hay, at \$5 per ton, \$2,250; which, added to amount received for wheat, would equal \$19,890, from which deduct \$6,070, will leave \$13,820 net profit. Now to raise crops like that this man expects, although the

water in the spring of the year when the rivers are in full flood are very fertilizing, it will in no wise compensate for the large crops here desired and confidently expected, as the water, when it runs over land, as it does here, has such a wonderful stimulating effect on the growth of plants that an immense amount of manure will be required to sustain such extraordinary draughts upon it as it is calculated here. So soon as one crop is harvested another one will be put in; and as this agriculturist expects to draw upon this land every time he harvests a crop, to the fullest extent of its capacity, and at the same time to increase its productive capacity very perceptibly every time he crops it, he, of course, understands that the fertilizing problem must be solved. He thinks, perhaps, that diversified farming will be the nearest road of this difficulty. He concludes, perhaps, here is a good opening for a large dairy, for the purpose of making butter, and feeding the sour milk to pigs. Then there will be a great deal of preparation to make, and considerable skill, labor and money required. Much that will have to be done at the same time in the line of building stables and appurtenances, planting the entire second level in alfalfa, and the third and fourth levels for a second crop in corn and pumpkins, and the purchase of cattle, horses and hogs, he has, as we have seen, cleared \$13,000 and over off the crop of wheat, but that will not more than furnish half enough capital to put this farm in shape that the highest percentage can be made out of the investment. So the shareholders may expect to pay assessments pretty lively for a few months. He expects of the hundred acres of alfalfa, and what feed he will be able to save off of one of the two lower levels (for he expects to devote one of the lower levels alternately to some staple crop, such as Sea Island cotton, tobacco, rice, or whatever staple he may think there's the most money in), to carry four hundred head of milch cows, and to turn off for market 2,000 pigs, weighing 200 pounds each, at least. One of the first things he will do will be to build a wall of masonry along the line dividing the upper and second level, said wall to be just as high as the surface of the upper level. Then he will employ an experienced architect and builder for the purpose of drawing up a plan and the building of a stable for the 400 cows and about eighteen head of horses; also, a piggery. The buildings to be located with particular regard to feeding the alfalfa which will grow on the second level to the different kinds of stock. He will locate the stable as follows (the stable to be 700 feet long and 40 feet wide, walls 12 feet high, with gable roof): commencing at the north

end of the upper level, running south 700 feet for quantity, leaving a strip twenty feet wide on the edge of the wall that divides the upper from the second level.

The next thing to be done, after laying off this strip of ground, will be to dig a trench down the middle of it large enough to put in a plank sewer six feet wide and four feet deep in the clear; said sewer to be full length of the stable, and water tight. After the sewer is put in the dirt that came out of the excavation is carefully spread out over the balance of the surface of the strip, which will raise the surface of the ground from four to six inches. Then a tight floor of two inch plank, like the deck of a ship, will be laid over the whole surface of the ground laid out for a stable. An aperture will be left in the floor about one foot wide, immediately over the middle of the sewer, but so arranged as to be covered with a ten inch plank that can be easily raised up. The object of the tight floor and sewer is to save every particle of liquid and solid manure, as it has been clearly proven that the liquid excrement from animals is as valuable for fertilizing as the solid. This large sewer will be connected with the third and fourth level by small sewers made of redwood plank twelve inches wide and twelve inches deep in the clear, and to pass under the respective levels; the tops of said sewers to be fourteen inches below the surface of the levels passed under; said sewers to be put in position before the land is leveled; so arranged that water sent on to the fields may be made to pass through the large sewer under the stable when desired, and to convey the manure in a liquid state on to either of the two lower levels. Then he will take out the boxes and gates that were ten feet wide, that were placed in each end of the levees on the lower side of each of the three large levels, and carefully replace the dirt that was excavated for the purpose of putting in those boxes, and put in one substantial box, to be six feet wide in the middle of each of these levees, with gates in each end of said boxes. The small sewer connecting the large sewer under the stable with the third and fourth levels will be made to open out in these boxes. Then he will place covered sewers perforated with inch holes on the lower side of each of these levees, to be six inches wide and twelve inches deep, to be sunk one-half of their depth below the surface of the levels to be watered by them, and be made to connect with or issue out of either side of these boxes, to run the whole length of the levees; but to be closed at the end furthest from the boxes. Then when he wants to run sewage water on to the third level, he will close the mouth of the sewer that

conducts water into the fourth level; also the gates on the upper and lower side of the box, and the sewage water will be forced into the side sewers that are perforated with holes with considerable pressure, providing there is a big head of water turned on. When the fourth level is to be sewaged, the opening admitting sewage water out of the box into those perforated side sewers are to be closed, and the mouth of the sewer that conducts water on to the fourth level is to be opened, and the sewage water will be allowed to pass down to a similar box in the levee below, when everything will be arranged in the same manner. This is the most simple and efficient manner for the distribution of sewage fertilizers that it is possible to imagine; I think very nearly as good as that described in Stokes' Park, England, and this by the simple law of gravitation; the cost of which will be merely nominal. But he will return to work on the stable. Now he has a substantial and water-tight sewer and a water-tight floor laid over the whole ground laid out for the stable. He will now put up two rows of mangers throughout the whole length of the stable, ten feet from either wall, leaving a space in the middle twenty feet wide; but passage ways will be left every one hundred and twenty feet. It is calculated that a row of cows will stand on each side of these mangers, and two rows of cows feed out of one manger. At each of the openings above referred to small corrals, 100x120 feet each, are to be made, with water troughs in them, so that the cows may go out into them each day for water and exercise. By leaving an opening every one hundred and twenty feet will allow for eighty head of cows between each opening. Then he will build the stable on this foundation of the dimensions above described, but the timber supporting the middle of the stable must be very substantial, as he intends running a train of cars on the second floor; not by any means as heavy as ordinary R. R. cars. He will now lay down an upper floor in the stable full length, just high enough above the lower one for the health and comfort of the cows, about nine feet.

He will now measure off a tract of land for a haystack, to wit: commencing twenty feet south of the stable and running south along the edge of the upper level 500 feet long, 35 feet wide, being right on the upper edge of the Alfalfa tract—space enough, by stacking it sixty feet high, to contain 1500 tons of hay. He will now commence and lay down a railway track, commencing at the north end of the cow stable on the upper floor, and lay it down through the middle of it to the south end;

and from thence continuing it along on trestle work alongside of the ground set apart for a haystack. The track to be one foot higher at the southern than at its northern terminus; to be somewhat similar to those used by miners in tunneling in the mountains. Track to be six feet wide, wooden rails strapped with iron. Platform cars with stations to keep the hay on. The four hundred and fifty tons of wheat hay, so soon as it was cut, was put into a stack, the upper end of which was located at the upper end of this ground above described as set apart for a haystack. It covered a space of 35 feet wide by 150 feet long, and was 60 feet high. The idea of stacking hay sixty feet high he learned of those clear-headed gentlemen who have done so much for legitimate agriculture in California, Messrs. Haggin and Carr, of Kern Co.; the idea he thinks an excellent one in many respects. It can be protected from the weather much cheaper in that way than by putting it into barns, and is much cheaper put into stacks than barns. Now by putting on this track ten or twelve platform cars, as above described, it will be seen that he has placed his hay in such manner as to be able to feed it to his animals at small cost, as most of the hay is above the track, and as it takes much less force to move heavy bodies down than up, he has his hay at great advantage by availing himself of the law of gravitation. And when the cars are loaded with hay, they are transported on a down grade to any portion of the stable; and by having an opening left on each side of the track in the upper floor, right above the mangers, they can be easily filled with hay by tumbling it off the cars on either side.

Now the vacant strip of land twenty feet wide that was left between the stable and the wall of the upper level, he will prepare as follows, for a piggery: The first thing to be done is to put in a sewer eighteen inches deep and five feet wide right down the center and full length, and parallel with the large stable; the top of the sewer will be level with the surface of the ground; then he will make tight floors on each side, of two inch plank, the floors to slant towards the sewer to slant enough that water will run off the floors from both sides into the sewer. Then fill the sewer one-half full with pebbles the size of hens' eggs; then put a shed roof over the whole of this floor, and board up the sides all round just high enough to keep the pigs inside; then put in a long trough on the side furthest from the main building. Said trough to be connected by a small flume with the milk-house, which will be located just south of the

haystack. A manger will be erected over the trough, into which alfalfa will be thrown from the field that adjoins it.

Whilst the builders were at work on the stable, piggery and appurtenances, the farmer has been busily engaged in preparing the three levels, and putting in alfalfa and corn, to wit: he took the stubble land, so soon as the grain was out of the fields, said stubble having been left standing about three feet high, and launched on a big head of water laden with manure, as aforetime, and let it run until the ground was thoroughly soaked. Then so soon as the ground was sufficiently dry to admit his teams on to it, he put his reapers to work, and had the stubble cut off as close to the ground as possible, the swaths laid crosswise of their levels; then plowed the land one foot deep, the furrows running crosswise of the levels, the same as the swaths were laid. The swaths of stubble he had carefully deposited in every third or fourth furrow, and had them connected on the lower side of each level with a furrow also filled with a swath of the stubble, great care being taken to lay the stalks lengthwise of the furrows, and to see that they are carefully covered with the next round of the plow as deep as possible—his intention being to make those furrows thus filled with wheat stalks to serve as conduits for water and as tile drains, and for facilitating the irrigation of his corn without having to run the water over the top of the ground. He thinks the water may be made to follow these furrows filled with wheat stalks under ground, and is confident the ground will saturate the short distance between the furrows. The drain so improved will thus be made to connect throughout each level, and to connect with an aperture to be arranged in the boxes that connect the respective levels so as to drain the land; and then he will have both irrigation and drainage. He will so utilize his stubble in all subsequent crops. It's true, these dairies will not be enduring, from the fact that the ground will be kept continually moist, and the stubble will soon decompose; and for fertilizers these drains will then be worth all the cost, and can be readily replaced. When plowing ground, he will always have the harrow follow close to the plow, and pulverize the ground thoroughly; for in this artificial use of water, although he will be careful not to plow his ground until it is in proper tilth, it is liable to break and become like dobies if this precaution is not regarded. He believes, in the raising of any crop, that the most important part of the battle is to come off in the putting of it in, in the best possible manner; therefore in that he will spare no labor, and, before putting in any crop, he will endeavor

to reduce it to the consistency of a well ordered plant bed, and then with judicious watering in most cases he thinks he will have done his duty. But he will always, if possible, cultivate land after running water over the surface of it, without it happens to be meadow land. Now in this manner he has planted the second level, the one next to the stable and piggery, and the stacking ground being laid off right alongside of it, in his most important crop, alfalfa; and as it will probably produce more weight of vegetation than either of the three large levels, he therefore plants it close to where it will be fed out. The third and fourth levels he has planted in corn and pumpkins for a second crop. From this one hundred acres in alfalfa, thus put in, and the remarkably clever manner in which he intends feeding it, he expects prodigious results from it. Now with the four hundred and fifty tons of hay he has in the stack, and having a large amount of feed in prospective so soon as his alfalfa gets in full bearing, and the two hundred acres he has in corn, he thinks he is prepared for the reception and care of considerable stock. He really wants four hundred head of cows, but they are not to be purchased in so large numbers readily in the market; consequently, he will go around to the California dairies and purchase 1,000 head of young cattle of both sexes, and as he will have to wait sometime on their growth, he thinks he will purchase enough to pay him for waiting, and that by this means he thinks he will make profit enough to have his amount clear. They are about one year old, and he pays ten dollars per head; the best stock of ordinary cattle he can find. He has plenty of room in his large stable, and the corrals attached for their accommodation. When his corn gets ripe he will also purchase about five hundred head of the best stock hogs he can find, as when he gets fairly started in the dairy business he will want to keep constantly about two hundred fine brood sows. He will also purchase eight fine young bulls and eight fine heifers, for which he will have to pay about \$500 apiece for the former and \$250 each for the latter. He will also purchase six fine young boars for \$50 each. It will be seen that the piggery is admirably located in regard to feeding the alfalfa to the pigs, as it is immediately on the edge of it. All the manure the alfalfa will be allowed hereafter will be what it receives by way of the piggery, which will be supplied to it in the following manner: The alfalfa field will be divided as follows, to wit: By a line drawn from the south end of the long stable at right angles with it to the levee on the lower side of the second level, including all north of that line, which will be

twenty-eight acres, to be divided by a string of six (6) inch plank suuk in the ground edgewise to act as a levee, leaving seventy-two acres south of that line. Now a covered sewer, six inches deep and four inches wide, to be placed along close to the wall in front of the piggery, sunk one-half of its depth in the ground the whole length of the building, to be perforated with one-half inch holes, six inches apart on the side next the alfalfa; the sewer to be closed at both ends, and to be connected with the large sewer in the middle of the piggery, by a large wooden pipe. Another sewer of the same description, and connected with the large sewer in the piggery in the same manner, to be placed in front of the wall facing the seventy-two acre tract; then so much water to be kept flowing into the large sewer in the piggery constantly, as can be forced through these small sewers that are perforated with the one-half inch hole; the pressure being about eighteen inches.

Now, when this farmer has his stock of hogs up to about 1500 head, the amount he expects generally to keep on hand, and these hogs fed all they can eat of the most nourishing and palatable food for swine, he will naturally think that there will be sewage matter enough to keep this alfalfa field, the surface of which is as smooth and level as a house floor, with said sewage water percolating all over it, in the highest possible state of fertility. The hog-master will be required every day to wash down the floor of the piggery with a hose until it is perfectly clean; washing the filth into the main sewer, which will be kept well stirred by the hogs wallowing in it. After keeping the 1000 head of young cattle for one year in the best manner possible, the farmer will sell about six hundred head of them, reserving four hundred head of two year old cows, which is considered the proper age, by the best authority in the country, for cows to come into milk. We will offer in evidence an article taken from the *Fresno Expositor*, which this writer thinks is the pink of philosophy, and concurs with the editor of the above paper when he enjoins all farmers to study it.

EDUCATION OF DAIRY COWS.

Mr. X. A. Willard, daily editor of the *Rural New Yorker*, and a writer of practical force and scientific authority on all dairy subjects, in a late issue of that journal has the following sensible hints on educating dairy cows, which should be studied by all farmers and dairymen. He says: "The education of the animal for the dairy is of prime importance. Docility, good temper, quietness, all of which are necessary in a good milch cow,

are the results, in a great measure, of kind treatment and early education. Many a fine animal has been irreparably ruined by coarse and brutal treatment, for no cow that trembles from fright or exhibits great nervousness during milking will yield her greatest capacity for milk. Calves, from the first, should be fondled and made familiar with persons; never frightened or worried by dogs, beaten or cruelly treated; they should have no fear of their attendants, but rather express pleasure in their presence and a willingness to be petted and handled; the utmost kindness and tenderness should be shown in her management until the animal is thoroughly broken and shows no more nervousness at being milked than in the suckling of her own calf. Heifers that have been well kept will begin to come in milk at two years of age, and are regarded as making better cows than when coming in milk at a later age, since the capacity for giving milk is varied by habit, and an early development in this regard stimulates the secretion of milk, and, as found by experience, is productive of better results.—*Expositor, Fresno.*

The 600 head of cattle, after having been kept as above stated in the best manner possible, the farmer can dispose of them for beef, and counting on them weighing at least 600 pounds each, and at six cents per pound on foot, will be \$36 per head, and $600 \times \$36$ will amount to \$21,600, or equivalent to getting his 400 head of cows for nothing and over \$900 per month for keeping them, for which he has raised ample food off the 100 acres in alfalfa and off the third and fourth levels in corn and pumpkins. With 400 cows giving milk, and a full complement of stock hogs, with a milk-house large enough for a dairy of that size, and with a commodious dwelling capable of comfortably boarding and lodging about forty persons, and a garden and orchard in which he prides himself, the farmer thinks he is prepared now to go into the dairy business, and also to indulge himself in the way of some legitimate farming. The milk-house will be located immediately south of the ground set apart for a haystack, the walls of which will be 3 feet thick; the railway will be extended through the upper portion of it, so as the milkers can transport themselves with their milk to and from the dairy. But there will be a flume connecting the milk-house and the piggery, so that the sour milk and slops from the kitchen will run to the pig-trough of its own volition. Then the dwelling will join the milk-house on the south. There will be 32 persons required to operate this farm, notwithstanding everything in the way of buildings and appurtenances have been most skillfully located in regard to economy of labor; it will require of each and every one of these employees a most efficient, active and cheerful performance of the duties assigned them, to work the farm up to its full capacity; and as the farmer expects the

highest character of service from his employees, he will spare no pains to add to their efficiency; their moral, mental, physical and social well-being will be carefully guarded, they will live upon the fat of the land—much of it, however, the product of the farm. His idea will be to have every person and every animal under his care in condition for the highest enjoyment of life, his employees will be made to feel at home, and to feel that they had rather be there than elsewhere; wages \$30 per month, payable quarterly. There will be required about 20 young men and women for the dairy, the sexes equally divided, and about 12 other persons, including a superintendent and three other persons employed in the kitchen and dining rooms. The culinary department on this farm will receive particular attention.

Bath rooms will be provided, and the employees will be expected to avail themselves of them. The labors of the day will be brought to a close by 6.30 p. m., if not earlier; he don't like to see his people eternally drudging, but when they work to work with their might; he looks upon them as rational and social beings, therefore he will have a large, commodious, well lighted and ventilated room, in which they can all meet for two or three hours' social enjoyment, he will also have a well appointed library and plenty of newspapers. He thinks if he provides plenty of nutritious food and good beds for his horses and cattle, that is sufficient for all purposes, but thinks the human animal must have more. Now I think the intelligent reader has a good idea of how this farmer went to work to put his farm in proper shape, and his mode of acquiring dairy stock and pigs, and his mode of supplying himself with fertilizers, and his mode of distributiuig the same, in the shape of sewerage, by means of sewers, some of which he calls side sewers, that run along the upper side of each level, and perforated with inch holes close together; and now, after he has everything in readiness for business he will endeavor to give the reader an idea as briefly as possible how he will operate his farm, and also endeavor to show what chance for profit there is in this new agriculture. He has his second level now in full bearing of alfalfa, with sewage constantly percolating over it, except when necessarily shut off so as to harvest the crop, which he expects to cut every twenty days in the summer-time, feeding as much of it green to his cattle and pigs as possible; in fact the pigs will have it cut green for them every day, but will feed it green to his cows only while harvesting his crop, save in the winter season, when hay cannot be cured—he will then cut and feed it green to all his stock. He will, under no consideration, allow stock

to run loose over his fields. On this farm it will be either seed-time or harvest constantly, and the superintendent's head will have to be as level as the land he cultivates; he will have to keep his decks constantly cleared for action; he will require about twelve fine horses, and when a crop is to be put in or harvested everything will have to be in the best order possible. He will keep all the stock he can furnish plenty of feed for, but not one more. When the alfalfa is cut, and so soon as it can be cured, it will be put into large cocks and dragged up alongside of the stack, and the large derrick forks will reach down for it and hoist it on to the stack, thus making the cost of handling it as little as possible. He thinks it very important that hay should not be allowed to remain in the field and bleach a moment longer than is actually necessary.

The third and fourth levels, as before stated, will alternately be used for some staple crop, whilst the other one will be put in wheat first, and so soon as the grain is headed and the heads put into a large bin, the sewage water will be sent on to the stubble with all pressure, and as much sewage will be forced through these perforated side sewers as possible; then, so soon as the ground is thoroughly saturated with sewage water, it will be shut off and the stubble ground allowed to dry. Then he will have stubble reaped close to the ground crosswise of the level; then, as before stated, the ground plowed one foot deep, the swath of stubble carefully deposited in the furrow and connected throughout the whole level and with the drain in to the box, and as fast as the ground is plowed and reduced to the consistency of a plant bed the corn and pumpkins are to be planted. Then to water this corn so soon as it is planted he will keep constantly running through these sewers and into the corn field just what water these furrows, filled with straw, will absorb, until the corn will be in roasting ear. Then he will shut off the water entirely and let the corn and pumpkins get ripe. This farmer does not believe in eternally dabbling in the water, and thinks that there is such a thing as overdoing the thing in the way of stimulating the plant growth with water; and thinks there is no danger of overstimulating until such time as corn gets in roasting ear, cotton in the boll or wheat in the ear, but at that period he thinks it should be shut off. He thinks by using so much manure that it has such a heating influence on the soil so that crops will ripen at least two weeks sooner than they would without the manure, and for this reason he thinks by using the utmost celerity in planting and harvesting that he has ample time, in this climate, for raising five crops in one

year, to wit: One crop of wheat hay, one crop of wheat, one crop of corn, one crop of corn fodder, and last, though by no means least; a crop of pumpkins.

By giving these two lower levels all the manure from the large stable and the water-closets from the dwelling house, and that distributed to them in the shape of sewage, as heretofore described, and the land being cultivated like a garden (which the farmer can do with his teams and implements, by reason of having his ground on a water level), he will have what some people might think "great expectations" in regard to the amount of produce he will harvest from one acre of land in one year. This will be as follows, to wit: Two tons of wheat hay, one hundred bushels of wheat, one hundred bushels of corn, three tons of corn fodder, and five tons of pumpkins. This may seem monstrous to those people who are not posted as to the effect that sewage has on land. In reference to that I will introduce some English authority of the highest order. The well known English agriculturist, J. J. Mecchi, in a letter to the *Mark Lane Express*, extracts of which appeared in the *N. Y. Sun* lately, in which that gentleman said, "I would say to those who speak lightly of the value of sewage, how is it that land worth to rent some \$5 per acre, very quickly, when sewaged, increased in value from 100 to 400 per cent.? Witness Croydon and other places. How is it that the once worthless Edinburgh sewaged meadows are now let by public auction annually at prices varying up to \$220 an acre—the average, I believe, being \$120 an acre for the six months' occupation and crop?" But before we proceed any further in this direction, let us see what kind of an investment this kind of farming promises to be. We will first make a rough estimate of what amount of capital it will take to equip one of these kinds of farms.

For the first item let us find the cost of 320 acres of land and the water right.....	\$ 3,200 00
Cost of preparing land.....	5,000 00
Building and appurtenances.....	20,000 00
400 cows, at \$36 per head.....	14,400 00
Twelve head of horses and harness.....	3,000 00
Two large wagons.....	500 00
Two light ".....	400 00
Furniture for dwelling.....	3,000 00
" " kitchen.....	1,500 00
Farming implements.....	2,500 00
Eight fine young bulls, \$500 each.....	4,000 00
" " heifers, \$250 ".....	2,000 00
200 brood sows, at \$15 each.....	3,000 00

One-half dozen fine young boars, at \$50 each.....	300 00
Sundries.....	3,000 00
 Total amount of outfit.....	\$65,800 00
Now for expenses for one year, to wit:	
Cost of labor for thirty-one employees for twelve months, at \$30 each per month.....	\$11,160 00
Board and lodging per month for thirty-two persons, at \$20 per month each, will be \$640 per month, and for twelve months.....	7,680 00
Superintendent.....	1,800 00
Insurance	1,000 00
Railroad freight.....	4,000 00
Grain sacks.....	750 00
Water rates.....	200 00
Seed wheat.....	300 00
Mechanical work.....	1,500 00
Incidental expenses.....	4,934 00
 Total amount for expenses for one year.....	\$33,324 00
Now for the gross proceeds for one year, to wit:	
Twenty-five pounds nice yellow butter per month from each cow, at twenty-five cents per pound, \$6 25 per month from each cow, and for twelve months would be \$75 each, and for 400 cows....	\$30,000 00
10,000 bushels wheat, at \$1 65 per cental.....	9,900 00
2,000 pigs, weighing 200 pounds each at 6½ cents per pound.....	26,000 00
Amount received from lower level in some staple product.....	10,000 00
400 calves, at \$10 each.....	4,000 00
Four fine-blooded bull calves, at \$200 each.....	800 00
 Total amount of gross proceeds for one year.....	\$80,700 00
And from the gross proceeds for one year.....	\$80,700 00
Let us deduct total amount of expenses for one year.....	\$33,324 00
 Will leave a clear profit for one year of..... or six per cent. per month:	\$47,376 00

If this showing will not make agriculture attractive, this writer will be at a loss to know what will; and if the intelligent reader is not convinced of it, the writer is certain that it is on account of his lack of descriptive ability. For he is satisfied that what he has here attempted to explain is the perfection of simple, plain, practical agriculture. He has no doubt that, in some of the details, vast improvements can and will be made. But in the important matters, such as the preparation of the land, location of buildings and appurtenances, and in the mode of saving and distributing the fertilizers, he thinks he has left

no room for improvement, and would suggest to those who deviate from the directions here laid down, that they will be departing just so far from the most direct road. He has given no directions but what are absolutely necessary—has spoken no idle word intentionally. Some may think having stubble reaped, and using them and the pumpkin vines for the purpose of irrigation and drainage, and afterwards as fertilizers, excessive labor; but I say to you that the more intelligent and well-directed labor you put upon an acre of land, the higher will be the percentage you will make off of your capital and labor.

My idea is that it is "profit" that wise men should labor for. It's true, it requires considerable capital to follow the directions here laid down; but if one will but notice capitalists (and they should be good authority in such matters), they seem to be pleased to get to place their money in largely, when, by so doing they can increase their percentage.

There is certainly no breach of economy in any directions here laid down. Most certainly not in the sewage system; for through that the farmer gets as good a distribution of his fertilizers as though he had two hundred Chinamen employed at \$20 per month each, for that purpose, all of which he has, by investing, permanently, about \$5000. Most certainly not by sparing no expense for the comfort, health and enjoyment of his employees. Not by feeding his animals all they can eat on the fat of the land. Not by plowing his land one foot deep, for the simple purpose of burying his stubble and pumpkin vines for the purposes of irrigation and drainage, and afterwards, when decomposed, for excellent fertilizers. Not by cultivating his large fields until they are the consistency of an Italian or China garden, which he does with his powerful and well-bred horses, and with the best of farming implements, as well as natives of those countries can do it with their hand implements; and, of all things, he has committed no breach of economy by having his land leveled, for that is the foundation upon which this system (which is but another name for economy) rests. This system economizes to the enormous extent of eighty per cent. in almost everything. It was the intention of the author of this system to place agriculture on a firm, enduring and faultless foundation, on which it could run in the even tenor of its way without any more innovation, throughout all the coming ages, till

"The treasures of nature's german tumble all together
Even till destruction sickens."

And hopes that, through a judicious system of co-operation, it will inure to the benefit of the industrial and laboring classes more than to any other. When this new agriculture gets fairly inaugurated it will present the best opening for young persons to lay the foundation of a competency that has heretofore been known, as it is now entirely an untrodden field, and there is but a small portion of the cultivatable area of this planet that is not susceptible of this style of agriculture. Through a judicious system of co-operation employees on these kind of farms can if they choose, invest their savings, which can be done throughout this generation so as to return not less than five per cent. per month dividends, which, on becoming generally known, will be a great inducement for laboring people to be industrious and economical. Say, for instance, there are thirty employees on this farm, getting thirty dollars per month wages, ten dollars of this will keep them comfortably clothed, and pay all their necessary expenses, leaving them twenty dollars per month each for investment; which will amount to six hundred dollars per month, and perhaps there will be an equal number of employees on an adjoining farm, who will be able to save up an equal amount, which would equal \$1200 per month, and by co-operation these employees can have the great benefit of a combination of capital, skill, labor and experience, which, coupled with honest and efficient management, will be as certain to command eminent financial success as that the night follows the day.

The inauguration of this system of agriculture, while it elevates labor, will lower the price of land—nearly lower it out of sight. The land monopolist's occupation will be gone; for say for instance there are nine million acres of land in the great valley of California, and we have seen people for the last twenty years making tremendous but unsuccessful efforts to make farming successful and profitable by cultivating one-half of it, or $4\frac{1}{2}$ million acres, and the result is that about half of the farmers are flat broke, their land mortgaged, and their fields much exhausted. Now I think it has been conclusively shown that the new agriculturists can come in and cultivate one-tenth of the $4\frac{1}{2}$ million acres or 450 thousand acres and raise more produce off of it than was raised off the $4\frac{1}{2}$ million acres, and make it the most profitable business on this coast, bonanza mining not excepted. Under the present system $4\frac{1}{2}$ of the nine million acres are lying idle, but under the new system only one-tenth of what has been in use will be required to raise nearly double the amount of produce, thereby leaving over $8\frac{1}{2}$ million acres unemployed, which, for grazing purposes, little more than pay the

taxes, at a low price; therefore of all things there should be no dearth of land.

One very important item in this new business, this system, it seems to me, will have a tendency to shrink up and contract the area of cultivated land just nine-tenths.

Our land monopolists at present are weary and heavy laden; they are termed land poor, but still they are a wonderful check to progress. Land monopoly is not only a curse to those who hold it, but a curse to those from whom it is withheld.

I have often wondered why men representing California in the National Legislature did not have the government lands in California withdrawn from market, and only to be disposed of through homestead and pre-emption laws; it would have been a great blessing to the country in general, and the laboring people in particular; but the curse is upon us, that is a melancholy fact that cannot be gainsaid. But the position of the large land-holders is anything but enviable in most localities; I think it is the best property to go short on in the country; they have an elephant on their hands, and the great leveling machine, so soon as it goes to work, will increase his magnitude just ten fold, and that is too big a raise for an unnatural and tottering institution to stand. It is the sincere hope of the writer that but a few years will have elapsed until land and water monopolists will be known only through tradition. They lie directly across the path of progress.

It seems to me that of all shapes mal-legislation, not to say corruption, ignorance, incompetency and venality have taken in the last seventeen years, the successful attempt to rob the American people of their patrimony in the matter of the public lands of the United States is the most damning. It almost looks as though "legislators," both State and National, had joined hand in hand with land grabbers and corruptionists, as witness the disposition made of the swamp and overflowed lands and the State School lands, the people at large and the State receiving little or no benefit from them—the actual settlers in most cases having to pay speculators an advance seldom less than four or five hundred per cent; and it seems that the rapacity of these sharks is on the increase, for in the last Congress they succeeded in having that latest iniquity, "The Desert Land Bill" passed, "a thing devised by the enemy," a scheme whereby a certain old sinner living in San Francisco, with a high, narrow forehead, stooping shoulders, protruding chin and cadaverous face, a picture of sin and sorrow, the genius of land and water monopoly, may gobble up, through the

odious, dunning system, what remaining land there is in the outskirts of civilization.

But I am in hopes this kind of business has culminated with Dr. Wosencraft and his "associates" modest request to have the Colorado Desert turned over to them section by section and township by township. From my stand-point this is one of the most infamous bills ever presented to a legislative body. "This is the unkindest cut of all"; the idea of turning the Colorado Desert over to a lot of hungry land grabbers; and it at the same time susceptible of being made to produce more agricultural wealth than was ever ruled over by Queen Cleopatra and all the Ptolemies. Why the Colorado Desert can be made easily the most fertile spot on the planet; it can be made to resemble a patch in the planet Jupiter, which, according to the Flammarion speculations, there is neither fall winter or summer, but "eternal spring."

It has often occurred to me that this thoughtless American people were criminally indifferent in allowing themselves to be bereft of their patrimony; but it seems that God arms the thoughtless and harmless.

For wait till the great leveling machine goes to work, and you will see the fruits of their corrupt practices turn to ashes in their grasp. Verily, "Justice travels with a leaden heel, but strikes with an iron hand. God's mill grinds slow but dreadfully fine." Wait till the great leveler goes to work, and a big head of water is turned on, and you will see the fruits of infamy and corruption disappear as fog before a heavy gale from the north. It will batter down infamy and corruption faster than all the corrupt, venal and incompetent men in high places can build it up; that is, with a few honest and capable men to oppose them. Why will it do so much? Because it will strike a death blow to land monopoly and give material prosperity to the industrial and laboring classes. The S. F. *Examiner* well says that "all evils naturally follow in the train of poverty; and history teaches us that it is almost impossible to elevate the intellectual and moral nature of a nation without first improving its material condition." Under the pernicious, wasteful and thoughtless system which agriculture is now prosecuted, and the land being held in such large bodies, oftentimes by non-residents, the real agriculturists and the agricultural laborer are so cast down by having to make such a severe struggle for existence that they have no time or inclination for reflection, and fall an easy prey to demagogues and corruptionists. Put these

same people on the road to prosperity, and you will see quite a different order of things.

My impression from reading the San Francisco papers is, that that little Spring Valley Water monopoly is a weariness in the flesh of the citizens thereof ; entering, comparatively, in a small degree, into the occupation and affairs of her citizens, to what it will into the pursuits of the legitimate agriculturist whose almost every moment will require water. Water monopolies, if allowed to be fastened upon the agriculturists, will prove intolerable. The idea should not be entertained for a moment. It would be a disgrace to humanity; an abomination in the sight of the Lord. It would be subversive of the spirit of liberty, independence, progress, manhood and good conscience. My experience has given me the impression, whether well founded or not, that monopolists and corruptionists go hand in hand. And what kind of a country would California be to live in, provided there were a hundred little Spring Valley Water Monopolies scattered throughout the State ? This iniquity should be strangled in its infancy. I think the District plan, such as that known as the "West side irrigation scheme," gotten up to water the country from Tulare Lake to Antioch, a wise and good arrangement, and a plan that will do well to adopt throughout the great valley. Districts should be empowered by the Legislature to condemn all irrigation works and water rights necessary throughout the State. According to my calculation, it only requires five per cent. of the landed resources of the great valley to raise as much produce as has ever been raised in it in one season; and, from close observation, I am of the opinion that there is plenty of water for every acre of land in the valley. If this theory is correct, then there is certainly a great abundance of the raw material out of which to build up this new agriculture. And assuming the District plan of irrigation in operation, whereby people can have their pro rata of water for the cost of construction and maintaining their irrigation works, there never was a better opening for mankind in general to go into legitimate agriculture. But the idea that I wish to impress upon the people is, that when they happen to have 320 acres of land, such as the average land of this valley is and the use of ten feet of water per second when necessary, that they have by no means a farm yet. Neither has the foundryman an engine, simply because he happens to have ten or fifteen tons of iron on one side of his shop and as many tons of coal on the other; but he has the wherewithal, by using considerable labor, capital and skill to make one.

THE BEST LOCATION FOR THE NEW AGRICULTURE.

In seeking a proper location for the new agriculture, there are a few material points to be considered : One is, the soil or sand should be at least four or five feet deep over the bed rock or hard pan. It is not absolutely necessary that the soil should be fertile (for we know how to render anything in the shape of soil fertile); pure sand will do, or greasewood; sage brush or alkali soil is good enough. The sand dunes around San Francisco, by having the use of the water of the Spring Valley Company, can be converted into a model farm, more fertile and productive than Mussell Slough. Six or seven miles to the eastward of Virginia City, Nevada, is a splendid location for it, for the reason that here you have a large city at a great elevation, and an unlimited amount of what can be built up into the most fertile lands (the Humboldt desert), by putting in a flume and by using the snow water from Mount Davidson, and the winter rains, and sending down the sewage water from Virginia to the edge of the desert, which would furnish fertilizing material for at least 10,000 acres, and then by bringing the waters of the Carson around to meet it, and by cultivating these 10,000 acres as heretofore so carefully directed, there would be a land overflowing with milk and honey, a veritable cornucopia. The Humboldt desert, by utilizing the waters of Carson and Truckee, can be made to produce annually more agricultural wealth than was ever produced in one year in the great valley of California. Vegetation can be made to grow in that climate, and throughout the great north, almost as well in winter as summer, by clothing their fields in winter with ice "as with a garment." There is nothing original in this ice clad business ; but until the great leveler goes to work it is impracticable. Put that to work, and on the foundation it lays you can pile up the combined wisdom of ages, and it will fit as though made to order. Nevada, when she elects to embrace the new agriculture, will become great in wool growing, stock raising and dairy products. Her immense deserts can be made as productive as the polders of Holland, and the place to begin that work is near Virginia, by using the town sewage. The produce consumed there for the last twenty years could have been raised at the enormous profit of ten per cent. per month on the investment, and been furnished for about one-half the prices obtained there. But we all despise wisdom and love folly. Well, we have been drinking deep, deep of the latter, haven't we? This system of agriculture is just as well adapted to New York, Pennsylvania and the New England States as it is to the great valley of California ; in fact, it is at

home wherever land and water are brought together, as has here been so carefully described.

Put the great levelers to work and we will have no more winter, no more summer, no more fall, but eternal spring. Through that the land can be covered with fatness, and poverty and destitution driven forth o'er the wilderness. The exhausted fields of New England or the great West would be a charming location for us. Only give us a small stream of water, under heavy pressure, and a stream of eight or ten feet per second, and we will soon lay the foundation for you, and then it is plain sailing. It's all in the foundation. Get that right, and all will be right.

AGRICULTURISTS

will become successful just so soon as they begin to employ water as a servant. It can be made a servant more valuable than all the rest of the auxiliaries of the farmer, put them all together, and almost without cost; nothing but the harness and it will cheerfully perform the vilest drudgery about the farm in the most dexterous manner, and for the portion of any desert where greasewood and alkali abound in the soil, the land to be prepared, as heretofore directed, in all cases, and the river water simply allowed to run over in a broad and shallow stream, not more than one inch deep, until all the ingredients in the soil inimical to plant life are cast out and thrown off, and in all cases, if the water is allowed to run long enough, you will have spontaneous meadows of the most nutritious wild grasses to cover the entire surface of the ground that is properly prepared. So you see we are not particular as to the quality of the soil. The land should be on an incline, not less than four nor more than ten feet to the mile, if convenient. But it can be used at a great deal more or less. The west side of the San Joaquin or the west side of the Sacramento, when they elect to embrace the District system of irrigation, will be most magnificent locations for the new agriculture, imaginable. In Stanislaus County or San Joaquin County they are agitating the subject of bringing out irrigation canals, and when they go to work in earnest there will be a good location. I hope they will all elect to embrace the District system. I think it will be much better for all. There is no speculation in either land or water ; at the rate we have been progressing it will take the people of the great valley of California until the year A. D. 1900 to utilize fifteen per cent. of the land and water in the valley. People will find out when they go to work systematically to using wa-

ter, that they cannot make large farms profitable; and they will find out that the higher state of cultivation they put their land in the better it will pay, or rather, the larger will be the per cent. on their money. There is more profit in the judicious use of ten feet of water per second, when they really need it, than there is in owning a large canal and depending on selling the water. To have the use of ten feet of water, when needed, will not probably amount to more than one foot per second constantly. The great profit and speculation, henceforth, will be right where it ought to be; that is, in the labor. For instance, if a company purchase 320 acres of land, say for \$5 an acre, which will be considered a fair price when people begin to find out what their land is really worth, and it costs \$5 an acre to put water on it, which, when people begin to understand themselves, they will think a very extravagant price, then there is a chance for a speculation in building this land up to the highest state of fertility. Land can be made to return \$200 an acre profit annually, when unimproved lands alongside of it will not be worth more than \$5 an acre. I am satisfied that if land in England can be made worth \$220 per acre rent for six months' occupation and crops, although their markets are a great deal better than ours, we can make our land in twelve months earn \$200 an acre profit by being up with the times in every way. In the new agriculture 320 acres is as large as a farm ought to be to work to the best advantage, and from that down to five acres, every acre in alfalfa, calculate on keeping four cows. Cows, pigs and chickens can be kept economically together. Now to use sheep instead of cows; fifty sheep can be calculated upon to the acre, and the manure crop of the sheep would be as valuable to the farmer as the wool crop. To a great many it will be a great mystery where the profit comes in so largely in the new agriculture. It can be answered in a word: "Economy." And the way in which the sewage water is here used it has about the same effect on the land as saliva and gastric juice has to the human economy. And again, in the trifling matter of plowing, to raise as much off one hundred in the new as off a thousand in the old way, we will have to raise two crops a year; consequently, we will have to plow our one hundred acres twice in the same year, one foot deep; and to plow one acre with a sulky plow, that cuts two feet of a furrow each round, our team of three fine horses will have to travel four miles, and to plow one hundred acres four hundred miles, will have to be traveled; and to plow one hundred acres twice in a year the team will travel 800 miles. Now the farmer who

cultivates 1000 acres in the ordinary way, providing he uses the same kind of plows and teams, his teams will have to travel 4,000 miles. Here we save 3,200 miles' travel for our teams. Now we economize nearly in the same ratio in everything. The coming farmer is going to be educated for his calling ; the shepherd will not be given a team of fine horses to plow, but a man skilled in that occupation will be put at it ; he will be well paid, well fed and given steady employment the year round, and will be expected to do big, manly work. When sheep are used instead of cows, not more than one-half of the employees will be needed, perhaps ; and at that rate, to draw out the full resources of the great valley of California, an army of 450,000 farm laborers will be required. Inaugurate this system of agriculture and it will abate more evil than anything imaginable, and the whole country will enter upon an era of unexampled prosperity. Extensive manufacturing will follow as a natural consequence. There is nothing impracticable about it. It's true it's about 4000 years ahead of the times in which we live, but it's the nearest road out of our difficulties, and we can't afford to sit down and wait for that time to roll over us.

The great valley of California is good for one of two things —that is, for the highest possible style of agriculture, or good for nothing; but is pre eminently adapted to either. The prosperity of California is couched in these ten words: "A thin sheet of water in motion over the land." That's the way this writer defines irrigation proper. Now there are many shrewd and wealthy men up the valley that have thrown up any amount of levees and checks, looking like breastworks for Von Moltke's army, which they fill with water, some portion of the ground two feet deep and over, and think they are irrigating. That is vanity. If these same gents were to see "irrigation proper" once, and found out the virtue there is in it, they would open their eyes. What they call irrigation is very little to be preferred to the old plan of farming without the use of water. The disposition to overrun and hold in subjection "The whole boundless continent" is almost irresistible to "Los Americanos." This disposition, though, is being and will be literally starved out of him. As aforesaid, it is profit for which we are laboring. Now, in the pursuit of agriculture, it is the large crop on which the profit is made; for instance, in raising wheat, it takes seven bushels per acre to pay expenses. Now if we raise ten bushels to the acre, we make three bushels profit off an acre of ground; and if we raise one hundred bushels to the acre, our profit is ninety-three bushels to the acre. Under the new system it

costs very little more to plow the land than under the old. The reason we plow the land one foot deep is to get a chance for burying our stubble and vines, for the purpose of using them for facilitating irrigation and drainage; but for that, we would not do it, and for seeding and heading it costs no more under the new than old system. To go to work to make an argument in favor of the new agriculture, seems to me like going to work to prove that the sun shines in the middle of the day. There is no getting around it, California is bound to embrace it, and the sooner the fact becomes generally known the better for every one. Here now, in the San Joaquin Valley, on account of the drouth, bankruptcy, ruin and desolation are holding high carnival, and at the same time there are a dozen or so rivers running into the valley, either of which would have furnished water enough this season, had the new agriculture been in operation, and their water brought out on to the plains and utilized, not only to have had every head of stock in the valley sleek and fat, but to have raised more produce than ever was raised in it in any one season. But the great leveler must precede irrigation; for instance, at Borden, they have a stream of water at work there now that is fifteen feet wide and twenty inches deep, and their land prepared for irrigation (after their fashion), and all that big canal can irrigate is thirty acres a day, of twenty-four hours. Now put the leveling machine to work, and prepare that same land for scientific irrigation, and a stream one-half of the size there used would be ample to irrigate 320 acres in the same length of time. Since commencing this writing I have read a notice in the papers that the citizens of San Joaquin Co. have wisely concluded to avail themselves of the district plan of irrigation, and intend to build a canal out of the Stanislaus River for the purpose of irrigating their vast plains. I think they mean business. If my impression is correct, I would say to all persons wishing to engage in agriculture that they might not easily do better than by joining their fortunes with those of the enterprising people of San Joaquin Co., as it is possessed of many advantages, the most important one being the good sense displayed by her citizens in embracing the district plan of irrigation. I think it a great boon to live amongst intelligent people. And, again, it is right in the market; and, again, the Stanislaus is a muddy stream, consequently holding much fertility in solution. There is plenty of room in that one county under the new agriculture for all; for be it remembered that we only require four hundred and fifty thousand acres of land to raise as much produce per annum as has ever

been raised in one year in the great valley. But San Joaquin County is an old settled country, and the land there is all undoubtedly held by private parties that may not want to part with it on reasonable terms. But when they go to irrigating scientifically, they will find out there is very profitable employment for from five to ten times the number of agricultural laborers hitherto employed; but I would advise no one to settle on land where the water was held by private corporations, as they will be eternally liable to vexatious impositions.

Stanislaus County, that adjoins San Joaquin, should the citizens avail themselves of the district plan, is a fine field. Her shifting sand plains, by running the water of the Tuolumne out on to them, through the new agriculture, could be rendered immensely productive.

I think the district plan of irrigation is as much to be preferred to the private corporation plan as freedom is preferable to slavery; and think the latter plan capable of impeding the progress of a community as much as the institution of slavery checked the progress of the Southern States. I have studied the subject carefully, and advise people to avoid it, although "time was" when I was strongly in favor of slavery; but now that it is abolished, nearly all of us look upon it as having been a curse to all parties that had anything to do with it. Now land and water monopoly will be looked upon very soon in the same light. Just as soon as people go to farming in a sensible manner, land monopoly will fall of its own weight, never to rise again; but, perchance, should people now engaged in other businesss want to embark in legitimate agriculture, they would very likely have to pay fancy prices for land, for undoubtedly nearly all the land is "gobbled up." But "Babylon is falling," as witness his Majesty, the great ex-grain King, has fallen like an immense Italian pine. Now if his late Majesty had kept out of land and water monopolies, like a prudent grain King, doubtless to-day he would have been all "hunkadora." The newspapers intimate, in relation to Mr. Friedlander's downfall, that irrigation has fallen far short of what was expected of it. Well, I should say it had. That's just what's been the matter with this writer for the last twenty years; and if his Majesty's bosom friends had only kept their clutches off of me and mine seven years ago, the great calamity, that is now carrying everything before it, would have been carefully guarded against, and would have fallen harmless on a country strongly fortified against its ravages at all points. But no; there was supposed to be immense wealth and much honor to

be gotten out of what I was in the rightful possession. Decidedly too much, as those supposed-to-be minions of this grain King thought a poor man ought to have and to hold, and fools must needs rush in where angels tread cautiously. Now I guess some of these ex-Kings realize the force of Captain Macs's remark, that "Irrigation is something that the American people know very little about." And if they had only let me alone for a little while—I was close upon the track of it—I would have solved this irrigation problem. What the people needed seven years ago they need to-day—that is, to be shown how to prepare their land so as to make irrigation practicable, and consequently profitable. All the rivers in the State may be taken out in canals, and until the people are shown as above, irrigation will not be worth the keeping the canals in repair. Now, when I commenced operations, seven years ago, to run the water out of King's River, I more than suspected what has since been learned by experience, that there was a very knotty point in regard to making irrigation a success to be unraveled; but your great Kings must needs rush headlong, and grab up everything of the kind in the valley.

But why lookest thou on yon gray tower; the owner is forsooth a gentleman and ~~not~~ But yesterday he and his men * * * *Butwer.*

And in

CONCLUSION

I would say that for about seven years before coming to King's River I had literally slept in irrigation ditches cut by my own hands, in Umatilla County, Eastern Oregon, only leaving there when obliged to obtain the necessary supplies. From having to work most of the time alone, I was brought in close communication with mother earth, and studied the open book of nature with the utmost diligence to find out the secrets of cutting canals and irrigating land to perfection, as it was indelibly impressed on my mind that in that direction the carcass was to be found, and on coming here and seeing the situation, I was confident that this was the finest field for the exercise of my skill in that line possible to be found in America; I thought I could perform wonders, and was extremely anxious to show what could be done with water. Now I am certain that had it not been for land monopoly and its attendant infamies, that the experience, enthusiasm and desperate energy brought to bear by me upon irrigation in 1870, such an impetus would have been given to it here in the King's River country that it would have been irresistible, and that the waters of all the

rivers of the great valley would now be running out on to their respective plains, and the same people who are now "sitting in the dust" would be joyful and happy, and could defy the scourge that now threatens them with famine and ruin, for all that was needed to be done I was fully able to do (barring the incubus above referred to). To run water in large quantities out into the middle of the desert above referred to, was the first thing to be done, and then it was just as absolutely necessary to show people how to prepare their land so as they could raise 50 or 60 bushels to the acre, and at the same time build their land up into a high state of fertility, all of which, with my former experience and severe application, I would soon have been prepared to do. Now these old and foolish would-be kings, that caused my occupation to be wrested from me, took possession of the property with about the same ideas that had deluded me some ten years before—that is, that all that was necessary to make irrigation successful was to run water out into the midst of the plains, and cry out to the farmers: Here's land and water, come and buy, raise your 50 to 70 bushels of grain to the acre. And now, forsooth, irrigation has not come up to what was expected of it. It was not until after I was "crushed ^{out}," and had taken plenty of time for reflection, that I clearly see the reason why farmers were so slow to take hold of irrigation. Now I would say to all communities contemplating the construction of irrigation works to go ahead, that they are spending their money wisely and legitimately; for without water they cannot draw out more than ten per cent. of the capacity of their land, and with it they can work it up to its fullest capacity—but would say to them for God's sake not to allow themselves to follow in the tracks of many of their predecessors.

From reports, Messrs. Haggin and Carr, of Kern County, have undoubtedly been very successful in irrigating, under what circumstances I do not know, and am very certain it has been a great success at Mussell Slough, for reasons heretofore set forth, and believe it has been a partial success at Borden, where farmers are allowed to use a large stream of water; but on the average land of the great valley I believe success has only been attained on paper, and kept up at a cost so as to sell lots whilst the excitement was up.

Now that the people of California are awakening to the necessity of irrigation, the most important thing is, that they go at it understandingly. But I would say to them, sail in, cut your canals; but by all means, before you go to work thoughtlessly and allow yourselves to become disgusted with it, take a scrupu-

tinizing look around the country, and see what has actually been accomplished through its agency, and how it is being done. But I am satisfied that if the California farmers hit upon the right plan of irrigation, nothing will astonish them so much as their wonderful success. Go to Cache Creek, Yolo County, where I was baptized with fire and water between seventeen and twenty years ago, where my good friends, the Hoppin Bros., tried this levee and check system of irrigation (that some people at this day pride themselves in), and abandoned it. Go, if you please, to Walla Walla Valley, where fifteen years ago this writer cut a ditch for the purpose of irrigation and floating wood to the town and fort in the above valley, with his own hands, with a pick and shovel, which conducted a large stream of water, not less than ten feet per second, a distance of four or five miles. Ask Messrs. Bigham, Stetson, Col. Moore, Reub. Baskett and a dozen other prominent citizens whether I didn't complete it, and how much sport was made of me for having done it. Go to the Umatilla meadows, about forty miles from there, and you will see as substantially constructed and well located irrigation ditch as there is on the Columbia. Ask Frank Maddock (then Sheriff of Umatilla County), the Kaufmans, the Wilsons, the Mitchells, the Rue family, and Mr. Job; ask fair Tennessee, Jno. Bradburn, the Short family, and Col. Page, agent for W., F. & Co., Judge Bailey and Jonathan Swift; ask Dr. Teal and my friend, M. Ainsa, Jr., in whose store the office of my company (The Umatilla Canal Company, incorporated 1863) was located. Now all these good people were my friends and wished me well, but not a dollar could I get one of them to invest in my scheme. Some of them laughed at me, and more of them berated me for wasting my energies on what seemed to them an impracticable enterprise. Many said to me that I appeared to be a man of ordinary intelligence in regard to other matters, but, there was no use in talking, I was certainly a "little off" on the subject of cutting ditches, and advised me to go to the mines and use one-half of the energy that I displayed on the "Meadows," and they would guarantee that I would make my "pile." Now there was as much need for irrigation there at that time as there is to-day in California; for when I commenced cutting that canal barley was worth from two to three cents per pound, and then there were but few small patches, scattered through the "Meadows," that were moist enough to raise vegetation of any kind. As it is a well known fact that eastern Oregon is a rainless district, more so than the "West side" in

California, and there was a large sage plain on the outer edge of the meadows of about 10,000 acres, that my ditch, when completed, would command every acre; and I calculated on people raising at least sixty bushels of wheat or barley to the acre on every acre of it. After I had gotten it fairly completed and people would not buy the water of me, and by reason of the completion of the C. P. R. R., the trade that supported the town of Umatilla being diverted, times were very dull, and no prospect of their reviving soon, I left that country and came back to California.

I liked the people of Umatilla County as well as any people with whom my lot had ever been cast, and I was extremely anxious, so long as there was a prospect of making a success of my ditch, to get it completed, and show my friends the error of their ways for having laughed at me so much. One of the most intelligent and successful operators in that community told me that if I ever made a success out of the ditch business, that I could command him in all things; that he would follow blindly wherever I would lead. That was the feeling of many of them; consequently I used untiring energy to get my water to running out on to the meadows, and as my means were very small, I studied quite as hard as I worked to take every possible advantage in locating and constructing it, and since coming down here to Centerville have continued the study in the same direction, and think so effectively that I can show up something original in construction of such canals as that projected on what is termed the "West Side Irrigation District," or in doing the heavy work necessary in getting the water of the Sacramento River out on to the Colusa plains, that will lessen their cost much more than half. I am certain that I can furnish them plans that they could not choose but accept. Now for these impoverished districts to complete these great works, some originality will have to be brought to bear. If I can get a chance I will show them something original in the way of constructing irrigation canals, that these great engineers we read of in India, Egypt and elsewhere, can't hold a candle to; and not only that, I can show them how to utilize the water at every step, after I get it out far enough from the source so that it can be used, to as high a state of perfection as will be attained at any time within the next six thousand years. And if those "grave and reverend seniors," Mayor Bryant and the Honorable The Board of Water Commissioners of San Francisco, will give me a job, just to show what virtue there is in intense application and study in one direction, for seven-

teen years, I think I can show them more about water in a week's time than they have learned all summer traveling over the hills. I am strongly of the opinion that I can make it very apparent to them how they can introduce a stream of water as large as the Croton Aqueduct supplies, with a privilege of as much more as they want delivered on the hills of their city, four hundred feet above tide water, and at a cost of not to exceed ten million dollars. I am not entirely certain that I can do this thing; but I think the chances are fully ten to one that I can.

It looks to me to be simply disgraceful to see the immense amount of loss being sustained at this time in this valley; here are to be seen hourly, sheep and cattle men driving their starving herds to and fro in every direction, like a lot of crazy men, not knowing what to do or where to go; and bands of sheep whose wool clip would amount to \$2 annually, each, had they sufficient food, can be bought at this time all the way from 10 to 50 cents per head. Now, if legitimate, or in other words common sense agriculture were inaugurated, 5,000 head of sheep could be kept on 320 acres of land, and what they would eat would not be missed, but in reality would add wonderfully to the productive capacity of the land, enough at least, to pay for all the care and feed bestowed upon them. Now running water out on to the plains alone will not nearly correct this giant evil; that is an important part of the work, however.

Now there are many intelligent gentlemen in this community who own thousands of acres of land with ditches of water running bank full through their land, and their flocks starving, and they making no effort to save them by raising feed for them, for the reason, no doubt, that they think it would cost more to raise produce for them by means of irrigation than their stock would be worth. Now some of these gentlemen are my friends, and would like, the best in the world, to put me at something that I would be available for, and I have tried hard to induce some of them for the last two or three years to furnish me the means to go to work and prepare two or three hundred acres of their land for scientific irrigation, and put it down in alfalfa, so that they might never again be annoyed on account of feed for their stock; but my ideas were too novel and long drawn for them. Now novel and long drawn as my ideas may seem, but I have studied, as I think, every conceivable plan to prepare land, and it is the only practical plan I can think of.

It seems as though all of us who have as yet had anything to do with irrigation have invariably fallen in to the same error, and that all that was necessary to be done was to cut the canals and get the water once to running through on the highest part of the land, and then we would have immunity from all the ills that agriculture was heir to; now nearly all the people in this community who have acted on this erroneous idea, after getting the water to running through their lands as aforesaid, after trying it thoroughly and finding it wanting, abandoned it, and seemed well satisfied to let it drop at that. But I was too much the loser to give it up in that manner; was too strongly committed to it; in fact I was deeply imbued with the idea that there was a royal road to success if I could find it, and have went ahead, sunk to the bed-rock and struck it fabulously rich, and now all that is necessary is to develop one of these mines of wealth and let it become generally known that people with no very large amount of skill and intelligence can make 6 per cent per month off of their savings, and at the same time have their money in as safe a place as the Safe Deposit Company, and you will see thousands of men with small means and strong arms rise up as if out of the ground, ready to embark in enterprises of this character and it will come to pass that what we have looked upon as a curse (the rough and rebellious character of the soil) will turn out to be a most wise and merciful provision of the Creator, in that it will certainly develop here in California some of the greatest engineers that the world has ever seen; as boys from the age of ten years and upwards will, of necessity, be compelled to take notice of and exercise their minds on engineering problems, in assisting in preparing lands, and it is a most interesting and attractive study. I do not think it a great blessing to live in a country where we have to make little or no struggle for existence; but I think it very fortunate that there is to be opened up a safe standard and profitable employment for all, and that there is to be a field thrown open where all can enter and obtain a competency in a reasonable length of time by using prudence, industry and economy.

Now if I have succeeded only in putting the people of California on inquiry into the necessity of preparing their land before they attempt to irrigate it, I will flatter myself that I have accomplished something of importance; for, without that, I very much fear that irrigation will not accomplish what is expected of it, and that people of other communities will reap no more benefit from it than our people on King's River have done. For I am satisfied that people have only to be made aware of

that fact, and that that is the only thing that stands in the way of success; that they will not be long in finding out the best possible means of overcoming this impediment. But, I will say, without fear of contradiction, that the problem of how to prepare land for scientific irrigation, in the cheapest and best manner possible, is the most important one for the agriculturists of California or any other country to solve, and would say that if any man discovers a better plan than the royal road I have pointed out, I will be the first one to hail him as a public benefactor; for I firmly believe that the want of it is responsible for most of the calamity that is now raging in the land.

And before closing, I would say to the laboring and industrial classes of California, and the immigrants newly arriving in the country, that there is a good time in store for them; but do not be in a hurry in investing your small means. There will be an immense surplus of the raw material centuries hence in California and elsewhere, out of which to construct the new agriculture. California is larger by 2,000 square miles than Japan and we are told that one-sixth of the area of the latter country supports a population of thirty-three million; now the "new agriculturists are compelled to work their land up to as high a state of cultivation as these Japanese, or any other nation. Why, simply that they may make the largest percentage off their money; consequently, when people go to work in earnest, and bring a little common sense to bear on agriculture, they will find out that they need but a small portion of the immense surplus of the land and water. The great trouble now is, there are so many people owning, right in the heart of the country, tracts of land varying in size from thirty thousand to two hundred thousand acres; but "Babylon is falling," and wait till the great leveling machine goes to work, and the bottom will soon be washed out from under it entirely. And I would furthermore remark to these same people, when they read stunning advertisements advising people how they may make their fortune so rapidly, and without using either skill or effort, like such "enterprises" as the Gulf of California Oyster and Canning Company of "Professor" Blacklock, or this California Central Colony, I would advise them, before investing their small savings, to look before they leap, and would say to all that the poorest land in the great valley can, through the new agriculture, be built up into greater productive capacity than the now famous Kern Island, or Mussell Slough; alfalfa, water and diversified farming will do the work.

The question occurs to me, what will the pioneers of the nineteenth century not have accomplished for civilization? Here we have the railroad, the telegraph, the steamboat, and now comes "Time's noblest offspring," the great leveling machine, and the discovery of the art of agriculture. The two latter will have the startling effect of increasing the productive capacity of the planet tenfold, and, through their instrumentality, mother earth will henceforth yield up her abundant fruits with about one-fifth of the labor hitherto required.

The 20th century will certainly develop a superior civilization, as from present appearances it is to be ushered in under auspices the most favorable, and is to take quiet and peaceable possession of an almost entirely new world—a world just fairly emerged from barbarism (in an agricultural point of view)—a world of the sustaining capacity of ten of the old worlds we have been hitherto scratching over superficially. Now, after a struggle of six thousand years with ignorance, prejudice and oppression, we have but just discovered its wonderful capacity, and the best possible means of developing it.

Poverty and destitution they will not have to contend with, as there will be an inexhaustible field for all to enter and obtain a competency.

Why, the great desert of Sahara, by utilizing the waters of the Nile, can be made to support sumptuously the present sparse population of the world, besides maintaining, in the highest possible condition, all the tame cattle of the earth.

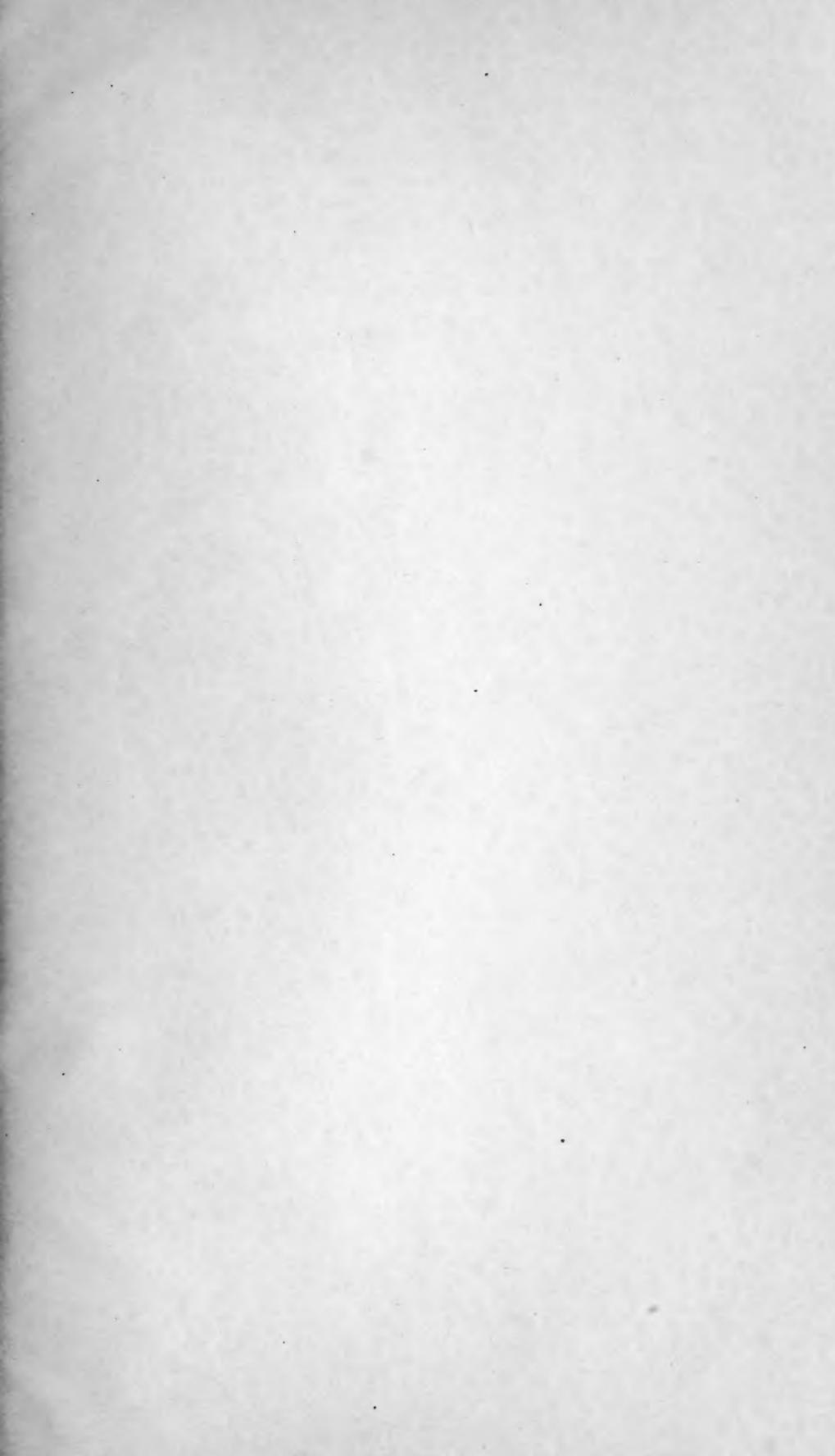
Here we have a world filled to repletion of the raw material out of which wealth, food and raiment may be created. With millions upon millions of capital lying idle, with thousands of able-bodied and willing men out of employment, many of them in destitute circumstances, put the great leveling machine to work, and you will see that Shakespeare was right, three or four hundred years ago, when he said that "Ignorance is the curse of God, and knowledge the wings with which we fly to Heaven."

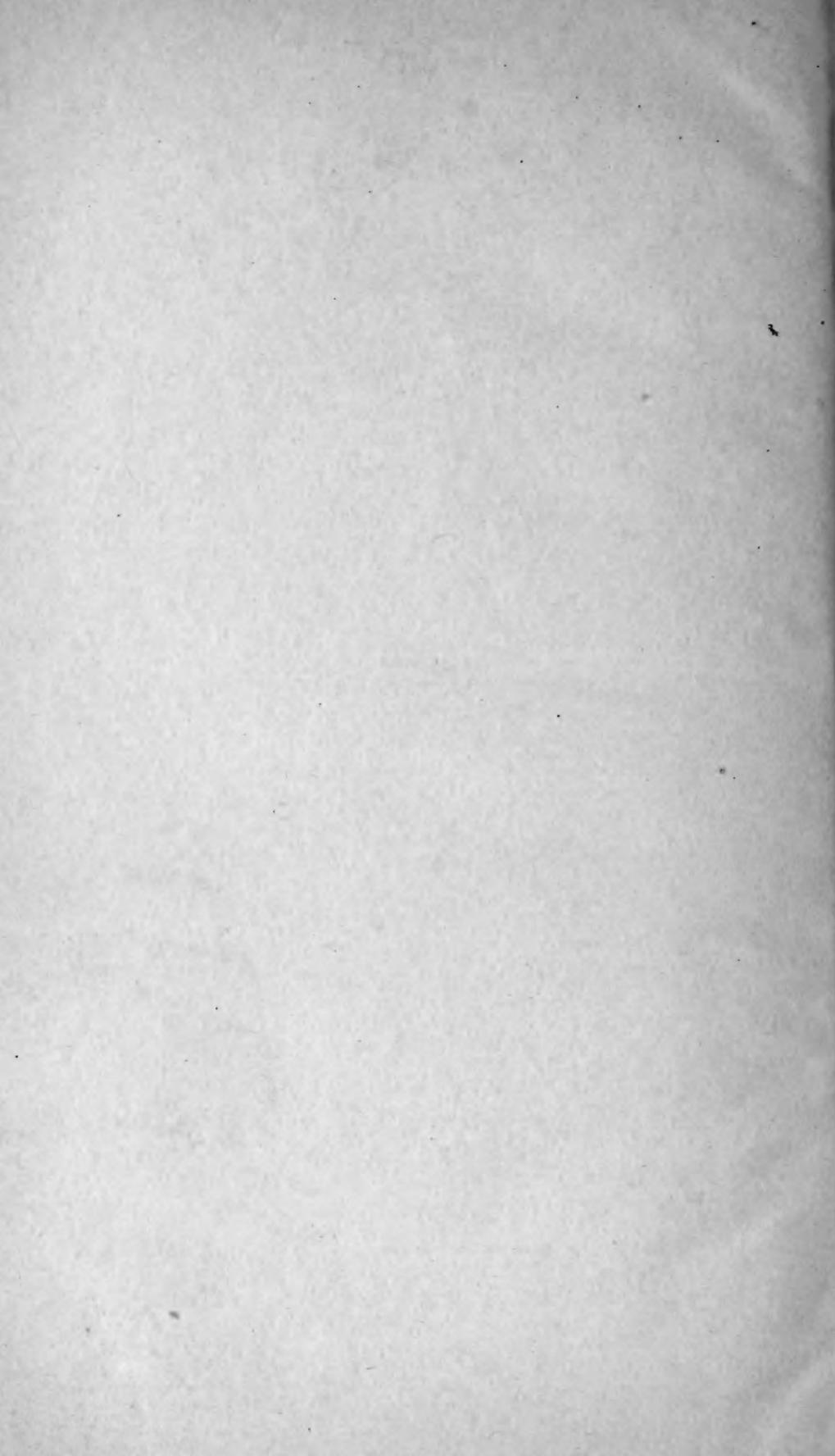
The New York *Graphic* says of California, "Its young men are bidden to go east, go west, go north, go south, go to the — to seek their fortunes, and they do go, and the State drifts that way."

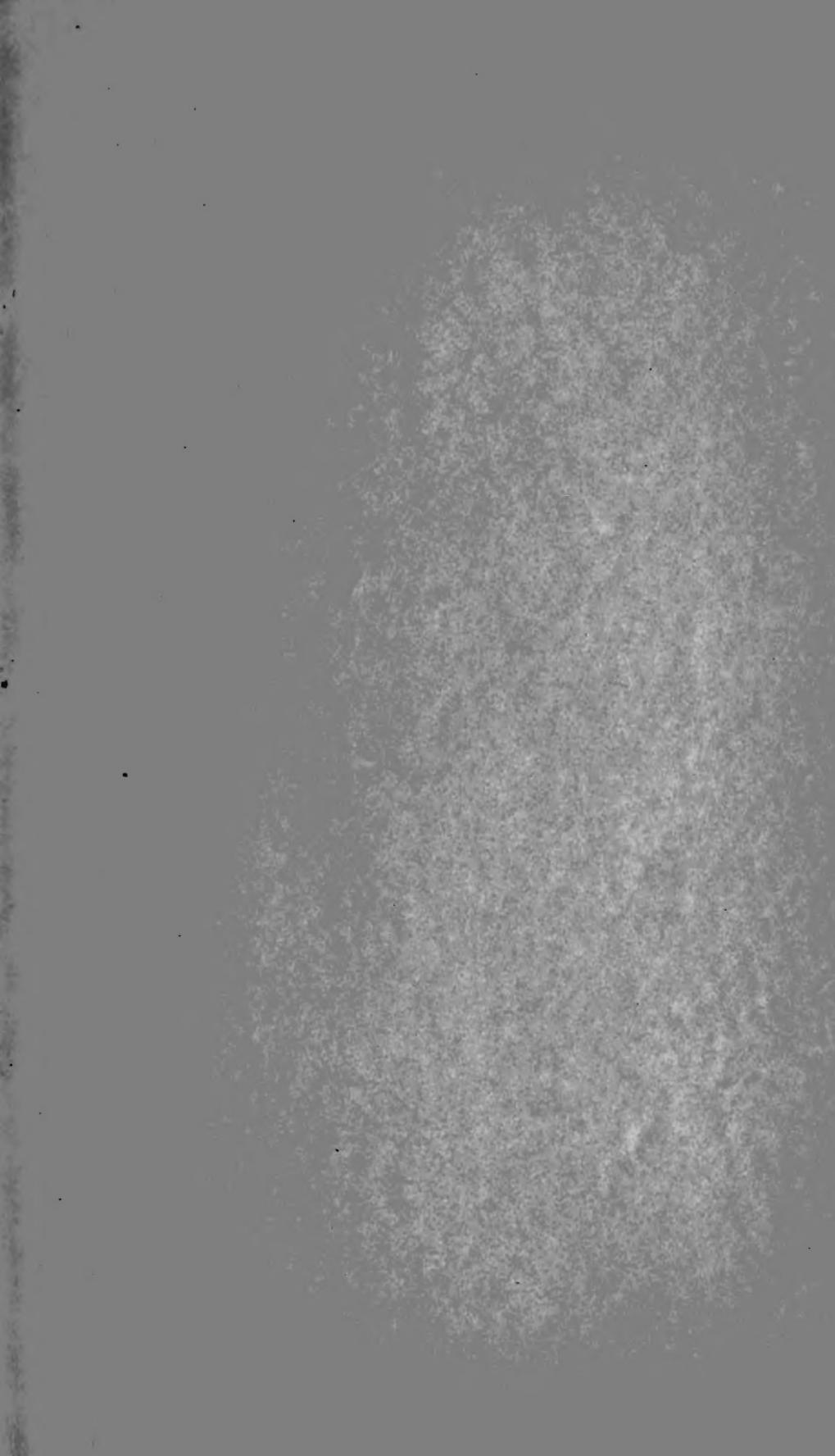
It assigns, as a reason for all this, that we haven't the intelligence to utilize the Chinese labor amongst us. Now it is very apparent to me that land monopoly and the pernicious, unnatural and barbarous system of agriculture that now obtains, is the cause of all our woes; and what is true of California, excepting land monopoly, is also true of New York, Pennsylvania and all the sisterhood of States.

Let the farmers, north, south, east and west, learn to utilize the abundant water they have among them, as has herein been so carefully directed. Then will "the winter of their discontent be made glorious summer."









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